



A HERITAGE IMPACT ASSESSMENT STUDY FOR THE PROPOSED PRASA'S MODERN
MAINTENANCE DEPORTS UPGRADE, BRAAMFONTEIN PRASA DEPOT, COJMM,
GAUTENG PROVINCE, SOUTH AFRICA



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DECLARATION OF INDEPENDENCE

This report has been compiled by Nkosinathi Tomose, leading archaeologist and heritage consultant for NGT Project and Heritage Consultants. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the project.

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EXECUTIVE SUMMARY

NGT Projects and Heritage Consultants (Pty) Ltd was been contracted by Ecosolve Consulting (Pty) Ltd to conduct an Heritage Impact Assessment(HIA) (exclusive of Palaeontological desktop study) for the proposed PRASA's modern maintenance depots upgrade, Braamfontein PRASA Depot (CoJMM) as part of specialists inputs impact assessment studies required to fulfil the BA process. Nkosinathi Tomose, the lead archaeologist and heritage consultant of NGT Projects and Heritage Consultants, conducted the HIA study for the proposed PRASA's modern maintenance depots upgrade, Braamfontein PRASA Depot, CoJMM, Gauteng Province, South Africa. The HIA, therefore, only assesses the range of all the manmade or human influenced/alterd resources within the Braamfontein PRASA depot development footprint (Figure 1). There was no Palaeontological desktop study carried out as part of this HIA study because of the nature and scope of the proposed development, but also because the proposed development does not occur within an area known for dolomitic formation.

The physical survey of the project area (footprint) took place between the 21 and 23 May 2013. The survey did not yield any traditional archaeological (from Stone Age to historical archaeology), burial grounds and graves, and other cultural features such as places or spaces of prayer . It yielded over 100 built environment and landscape features in form of buildings and industry related technological features. Because of the challenges that came with the quantification of the total number of buildings identified it was decided to bulk some of the total number of the identified buildings in clusters called site complexes:

- Braamfontein Site Complex-1; Braamfontein Site Complex-2; Braamfontein Site Complex-3; Braamfontein Site Complex-4; Braamfontein Site Complex-5; Braamfontein Site Complex-6; and Braamfontein Site Complex-7 (Figure 15).

In each complex, identified built environment and landscape features identified were graded in terms of the significance and impact significance of the proposed development on the identified resources took place. Through the system of impact significance analysis only one site complex (i.e. Braamfontein Site Complex-1) yielded buildings and structures that when assessed against the proposed development resulted to High and Low impact significance. High impacts will result if the proposed site mitigation measures are not implemented and low if the proposed impact mitigation measures are followed. The rest of the site complexes yield Low to Negligible impact significances i.e. Braamfontein Site Complex-2 to Braamfontein Site

Complex-7. Out of the seven Braamfontein Site Complexes, 4 site complexes will require to be mitigated and they include:

- Braamfontein Site Complex-1; Braamfontein Site Complex-2; Braamfontein Site Complex-5; and Braamfontein Site Complex-7

The rest of the site complexes will not require to be mitigated and they include:

- Braamfontein Site Complex-3; Braamfontein Site Complex-4; and Braamfontein Site Complex-6

The following conclusions and recommendations are made about Braamfontein PRASA depot in terms of heritage resources management: -

Conclusions:

- It is concluded that the current project upgrade/maintenance will have a minimal impact footprint on the identified resources provided they are mitigated as proposed in this HIA document. Therefore, in terms of heritage resources management there are no objections this project. The project can be given a positive review comment by PHRAG and ultimately a positive ROD provided that PRASA does agree to commit to addressing heritage concerns or mitigation measures proposed in this study.

Recommendations:

- It is recommended that PHRAG approves the project in terms of cultural resources management since there are minimal negative impacts of the proposed project on the identified historical resources sites located within Braamfontein depot proposed development foot print.
- This should be with provision that PRASA agrees to addressing heritage concerns raised in this HIA document such as mitigating buildings in the following site complexes:
 - Braamfontein Site Complex-1; Braamfontein Site Complex-2; Braamfontein Site Complex-5; and Braamfontein Site Complex-7

Proposition to PRASA:

- A proposition is made to PRASA to consider developing a Full Heritage Audit of the total heritage resources found in and around its premises in Braamfontein

Depot and Braamfontein Station to help contribute to the positive management of heritage resources in its property.

- o This will be a baseline (Heritage Framework) document for future development within Braamfontein Depot and Braamfontein Station.

#Refer conclusions and recommendations below for detailed recommendations of the study



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ABBREVIATIONS

Acronyms	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
BA	Basic Assessment
CBD	Central Business District
CoJ	City of Johannesburg
CoJMM	City of Johannesburg Metropolitan Municipality
CRM	Cultural Resource Management
COHWHS	Cradle of Humankind World Heritage Site
DEA	Department of Environmental Affairs
DoE	Department of Energy
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
K.y.a	Thousand years ago
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NEMA	National Environmental Management Act
PHRA	Provincial Heritage Resources Agency
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
PHRA-G	Provincial Heritage Resources Agency Gauteng
PRASA	Passenger Rail South Africa
PDAFP	Proposed Development Area Footprint
SADC	Southern African Development Community

SAHRA	South African Heritage Resources Agency
SPV	Special Purpose Vehicle

TERMS AND DEFINITIONS

Archaeological resources

This includes:

- material remains resulting from human activities which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;
- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Heritage resources

This means any place or object of cultural significance

I. INTRODUCTION

1.1. Project Background

This project is one of the proposed PRASA's depots upgrade and maintenance projects. The Braamfontein Depot rolling stock (upgrade and maintenance) depot is an existing PRASA facility in Gauteng Province, South Africa. Located within the City of Johannesburg Metropolitan Municipality (CoJMM) - the erven making up the site is owned by PRASA and zoned for railway (Figure 1). Braamfontein depot covers extends over 30 hectare and covers a length of 1490 meters (inclusive of the Braamfontein station). The actual project footprint covers 17.6 hectares and approximately 800m. Braamfontein was identified as the most suitable existing and future maintenance depot in Gauteng Province southern region for the newly proposed PRASA maintenance operations. The selection was made during the site selection process which took place in March 2012 (Arcus GIBB (Pty) Ltd, 2012). It is proposed that over a period of 20 years, new rolling stock will be introduced whilst the existing stock will be phased out. During this phasing period, both existing and new rolling stock will be maintained at the Braamfontein Depot - a process which will also involve construction or upgrade of maintenance depots. The site is located on the western end of the CoJ (City of Johannesburg) Central business District (CBD) across the M1 south/north and to its north is the Braamfontein cemetery where the Enoch Sontonga Memorial is based (Figure). Located

close to Park Station within CoJ CBD, Braamfontein currently provides the following maintenance and operational activities in the southern Gauteng Durban Metrorail Region:

- ¾ Running maintenance
- ¾ Heavy maintenance
- ¾ Train cleaning (External washing and intensive cleaning)
- ¾ Operational staging for approximately 55 train sets
- ¾ Carriage and wagon maintenance
- ¾ Shunting diesel locomotive maintenance
- ¾ Technical training
- ¾ Train operating staff resting facilities
- ¾ Shosholoza Meyl locomotive lifting

The maintenance depot has the following operational access:

- Double ended access from the main lines on the western side
- Double ended access from the main lines on the eastern side of the depot
- Single entry access on the north-west corner of the yard
- All train operations in the yard are manually controlled and turnout sets are operated by hand tumblers.

All train operations in the yard are controlled by yard signalling and turnout sets are hand operated by hand tumbler.

This HIA study forms part of specialists' studies inputs into the BA process. The study aims to advise on some of the best suitable heritage mitigation measures for heritage resources in terms of known heritage resources management measures.

1.1.1. Proposed Project Aims

"PRASA intends to modernise and upgrade their current services and their key objective is to promote rail as the preferred mode of transport for the majority of South Africans. [it is suggested by PRASA- 2011] that... 'this will only [be achieved or] become reality through adequate investment in the existing neglected system'. The poor conditions of the unreliable, aging rolling stock is the "single largest obstacle" for PRASA to achieve their planned objective. Combined with the broader strategy to acquire modern technology and a changing passenger demand, PRASA is focused on upgrading and investing in new rolling stock over the next 20 years" (Arcus GIBB, 2012). All the current existing metro trains will be phased out within the 20 year period. The newly proposed technology and improved maintenance practices envisaged for the new fleet will require newly refurbished maintenance depots. Other than infrastructure improvement - the overarching objective is to modernise and make relevant to metro passenger trains to existing and potential clientele/passengers - making the rail industry in the country more user friendly and preferred mode of transport. The current survey area was selected as the best suitable place for the proposed project out of a number of other proposed alternatives - eleven sites were selected during the feasibility or screening phase (Arcus GIBB, 2012). Therefore, the aim of the current study is to advise PRASA on the suitable and sustainable measures to use during the construction and operational phases of the project and its closure in terms of management of the natural and cultural environment. This is done through a compilation of various impact assessment studies that will feed into the current BA process and ultimately the Environmental Management Plan (EMP) document following the completion of the BA. This HIA study will contribute to the development of such documents through assessing and evaluating impacts that affect or have the potential to impact on the cultural environment. The general proposed infrastructure upgrade for this project throughout the country will predominantly involve the follow upgrades:

- Upgrade/Modification of the existing maintenance depots;
- New maintenance infrastructure which will include;

- Approximately 6 or 7 full length roads per depot for routine exams and repairs
- Component exchange roads, 2 full length roads per depot;
- Drop pits, under floor lift, or synchronised jacks for rapid bogie exchange;
- Specialised lifting equipment as required for trains;
- Shore supply (external power supply for trains auxiliaries);
- Roof access platforms;
- An automatic train washing plant, and facilities for pressurised cleaning of under frame equipment;
- An under floor wheel lathe;
- Paint booth;
- Adequate undercover storage for both small and large components;
- Fork lift trucks;
- New Storage Yards; and
- Upgrade/Modification of existing Storage Yards
-

At Braamfontein PRASA Depot the proposed Maintenance Depot facility will include the following Depot Buildings: :

- $\frac{3}{4}$ The existing running shed will be refurbished in a phased manner to enable maintenance activities to continue during this process. One of the existing running shed bays will be refurbished for maintenance of the new fleet and remaining two running shed bays will be refurbished for continued maintenance of the existing rolling stock fleet.
- $\frac{3}{4}$ The existing lifting shop will similarly be refurbished through phased construction if practical. The lifting shop will be upgraded in its entirety to accommodate both the new fleet and the existing fleet.
- $\frac{3}{4}$ The existing component work shop will be refurbished to store components for both the existing and new rolling stock fleet
- $\frac{3}{4}$ The existing administrative building, training centres, and C&W maintenance shed will be refurbished.
- $\frac{3}{4}$ A new train operations building will be constructed.
- $\frac{3}{4}$ New structures will include a external train washer plant, intensive cleaning shed, facility for Controlled Emissions Toilets clearing and tanking, a under floor

wheel lathe facility, a turntable for single-vehicle turning, and a new shunting diesel locomotive maintenance shed.

And the Rail Infrastructure will include:

The proposed upgrade of the existing Braamfontein engineering facilities or the railway infrastructure provides an opportunity to improve the site layout, modernise technology, and improve operational functionality and integration with the mainline operations. The upgrade of the Braamfontein engineering facilities will include:

- ¾ The existing staging yard will be remodelled to provide staging for 56 new generation trains (36 berths for 12-car trains and 19 berths for 6-car modules).
- ¾ The length of the remodelled staging lines will be 300m for 12-car trains and 150m for 6-car modules.
- ¾ New railway lines will be provided for reversing of trains at the eastern and western extremities of the depot site.
- ¾ A new under floor wheel lathe, a external train washer plant, a intensive cleaning shed, a CET facility, a test line, a C&W maintenance facility, a vehicle turn table facility and a shunting diesel locomotive maintenance shed will be constructed.
- ¾ The access lines to/from the existing main line will be remodelled.
- ¾ The entire staging yard will be signalled to allow for centralised train control for train operations within the depot area.

The above infrastructure is proposed because PRASA wants to design and construct a fully functional modern maintenance depot that will be able to service:

- PRASA's new metro trains by the time that the first new train sets are delivered in April 2015 and will cater for the maintenance demand of the new increased fleet required by the full fleet deployment up until 2034.
- PRASA's existing metro trains up until the new train sets full fleet deployment is completed in 2034.

1.1.2. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist

Because of the nature and size of the proposed development - upgrade and maintenance of the Braamfontein PRASA depot and associated infrastructure exceeding a total area of 5000m² on an area covering approximately 30 hectares and a length of 1680 meters with a development footprint of 17.6 hectares and approximately 800m - a need to conduct a BA developed. In terms of the EIA Regulations of June 2010 (Government Notice 543-546 published in terms of the NEMA, No 107 of 1998) the construction of the proposed facilities is listed as an activity that requires environmental authorisation. This is because the project comprises development of structures and bulk infrastructure such as roads, water supply and electrification– a development that occupies an area of less than 20ha. Furthermore there is already existing infrastructure on site and the natural environment had already be highly altered. Undertaking an a BA instead of full EIA process is therefore a requirement. The current process comprises of a BA and it involves the identification and assessment of environmental impacts through specialist studies.

Ecosolve Consulting (Pty) Ltd was appointed by PRASA (Ltd) as a lead Environmental Impact Practitioner to manage the BA process and associated impact studies for the proposed development project. Ecosolve Consulting appointment of NGT Projects & Heritage Consultants (Pty) Ltd as an independent and lead CRM firm to conduct a Phase 1 HIA (exclusive of Palaeontological desktop study) for the proposed development as part of specialists (inputs) impact assessment studies required to fulfil the BA process and its requirements. Nkosinathi Tomose, the lead archaeologist and the general heritage specialist for NGT Projects & Heritage Consultants, conducted the current HIA study for the proposed Braamfontein PRASA depot located within CoJMM, Gauteng Province, South Africa (Figures 1).

The appointment of NGT Projects & Heritage Consultants (as an independent CRM firm) is in terms of the NHRA, No. 25 of 1999 (as amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations), as well as other applicable legislations.

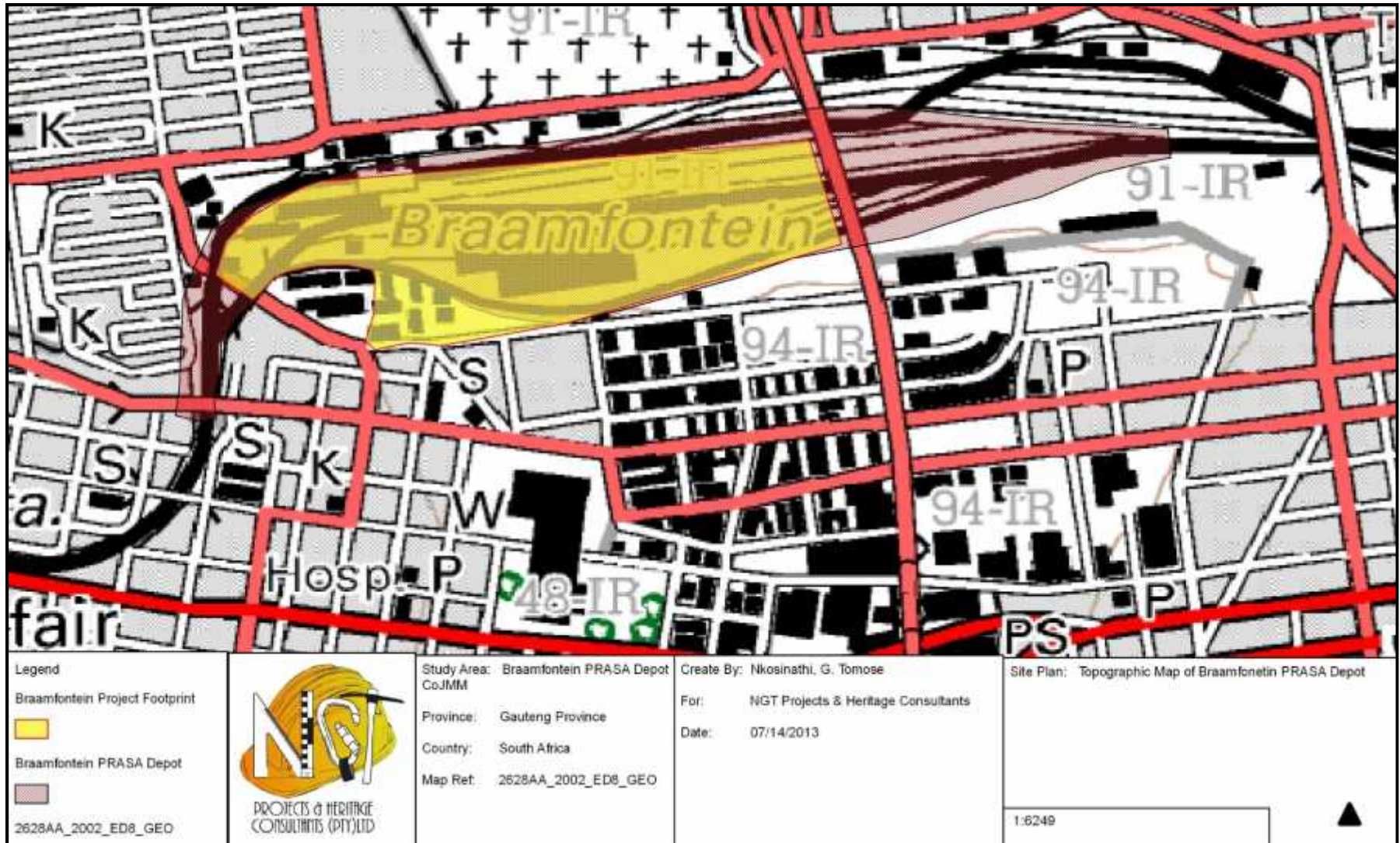


Figure 1 - General location of Braamfontein PRASA Depot (Note the current Johannesburg Park Station in relation to the depot - red circle).



2. BACKGROUND OF THE STUDY AREA

South Africa is rich in diverse forms and types of heritage, ranging from natural to cultural heritage. The natural heritage includes among other things: Geological, Palaeontological, and the various plant and animal species that define the country.

This HIA assesses the range of all the manmade or human influenced/altered resources within the Braamfontein PRASA Depot, and immediate outside it, but within the proposed BA project footprint as marked in Figure 1

2.1. Desktop Study: Archaeological and Heritage

South Africa is rich in diverse forms and types of heritage, ranging from natural to cultural heritage. The natural include among other things palaeontological, geological and the various plant and animal species that define the country. The cultural heritage which dates as far back as 2.5 million years ago (m.y.a) includes: the Stone Age Archaeology, Iron Age Archaeology, Historical and Industrial Archaeology, the different "Political/Historic" geographies such the Imperial (early 1900s), Union (1910), the Apartheid (1962) and Democratic South Africa (1994- to date).

2.1.1. Stone Age Archaeology:

The Stone Age Archaeology of South Africa is divided into three categories, namely: the ESA, MSA and the LSA. These Stone Age industries are well documented throughout southern Africa regions including the Limpopo province where the current study is located. Below are detailed summaries of the traits that characterises each industry artefact and/or material culture as well as the types of industries dominant in the province.

ESA – Early Stone Age:

The ESA is dated between 2.5m.y.a and 250 k.y.a (thousand years ago) – during this period predecessors of Homo Sapien Sapiens started making stone artefacts. The earliest known Stone Age industry is referred to as the Olduvan Industry. It derives its name from the first known Stone Age industry recorded in Olduvia Gorge, Tanzania north-east Africa. Stone artefacts associated with this industry are often described as crude and rudimentary in making – they define the earliest form of Stone Age technological innovation. The Olduvan is replaced, in the archaeological records, by the Acheulian Industry some 1.5 m.y.a. The Acheulian is characterised by large cutting tools (also referred to as bifaces) - hand axes and cleavers are the dominant forms of artefacts found in this industry. Sterkfontein Cave and Swartkrans located within the Cradle of Humankind World Heritage Site provide a good reference for the Early Stone Age sites within Gauteng Province and the immediate province of North West.

Other ESA tools which form part of what is called the Victoria West Stone Industry are found in regions such as the Free State (south of Gauteng Province) and the Northern Cape Province and these include: hand axes and what Smith refers to as 'Tortoise Cores' (Smith, 1920; R. A., Smith in 1915). This was probably Smith reference to the peculiar feature or morphology of Prepared Cores – where different pieces of where chipped off from a single piece of parent material to make way for the ultimate removal or shaping of a specific tool and most likely a well defined hand axe. A. H. J., Goodwin (1935) defines the Victoria West Industry with and without cores. Meaning that hand axes and cleavers could have been produced without necessarily having to prepare a parent material to a point to which a single definable tool could be produced. The absence of prepared cores in relation to hand axes and cleaver did not mean the end to this stone tool manufacturing techniques for it become a dominant and defining feature towards the end of the ESA into the MSA. What first became known as 'Tortoise Cores' was later defined as the transition marker between the ESA and the MSA. Therefore, the Prepared Cored of the Victoria West industry can be taken as the markers of transitional period in the Stone Age industry from Acheulian into the MSA, a second clearly defined phase in Stone Age technological innovation. Lycett (2009) sees the Victoria West as an evolutionary step towards the Levallois Prepared Core Technique which signifies the outwards spread of the Stone Age technology. Such technological innovation within the ESA is also endemic in the Early Stone Age site within the Gauteng Province.

MSA – Middle Stone Age:

The MSA stone artefact replace the dominant large and often imposing hand axes and cleavers that characterise the ESA. Such a distinction or transition in archaeological records has this far be dated to 250 k.y.a. During this period, smaller artefacts define the archaeological records and the most dominant ones are flake and blade industry. This period has been defined by some in archaeological circles as a period that signifies a secondary step towards the modern human behaviour through technology, physical appearance, art and symbolism (e.g. Binneman et al. 2011). This industry innovation is suggested to have been at its most highest during the last 120 k.y.a. With surface scatters of the flake and blade industries found throughout the southern Africa regions (Thompson & Maream, 2008). They often occur between surface and approximately 50-80cm below ground. Fossil bones may be associated with the MSA in some sites. The flakes and blade industries are often found in secondary context as surface scatters and occurrence like their predecessor industries. Malan (1949) defines the earliest MSA stone industry as the Mangosia and its distribution stretching across the Qriqualand in Northern Cape, Natal, the Cape Point, the Free State and the Limpopo Province our region of interest in this case. Our study region is however not mentioned in her distributions. The Prepared Core Technique which had become the defining technological technique of the MSA is in this industry replaced by the Micro Lithics that become a dominant feature or trait in the LSA. They mostly occur as surface scatter. The MSA tools include flakes, blades and points. Their time sequence is often not known because they mostly occur in surface. Other industries within the MSA include:

- The Howieson's Poort which is known to have wide distribution throughout southern Africa
- The Orangia 128 to 75 k.y.a.
- Florisbad and Zeekoegat industries dated between 64 and 32 k.y.a

In the central provinces most of the MSA stone artefacts are made from the following materials: fine grain quartzite, quartz, silcrete, chalcedony and hornfels (Binneman et al. 2011, see also Binneman et al. 2010a). Within the Gauteng Province one expect to find these tools in quartzite and quartz owing to the geology of the province. Like the ESA artefacts, the MSA stone artefacts occur in secondary context owing to a variety of reasons. One is due to natural events and/or activities such as erosion and being wash down by water and/or riverine activities, animal and human disturbances etc. Other archaeological site traits associated with the MSA and modern human behaviour are the early forms of symbolism in form of inscriptions

or markings which can be defined as early form of art in southern Africa (prehistoric art) and the adoption of the use of fire. The use of fire has been recorded in Swartkrans located within the COHWHS.

LSA – Late Stone Age:

The LSA spans a period from 30 k.y.a to the historical time i.e. the last 500 years to 100 years ago. It is associated, in archaeological records, with the San hunter-gathers. This is particularly important for the last 10 k.y.a whereby the San material culture dominates the archaeological records - mostly in rock shelters, caves as well as open air sites in both the interior and coastal regions. However, the San open air sites are not always easy to find because they are in most cases covered by the various forms and types of vegetation and the other contributing factor is the mobility nature of these people. They were not sedentary communities like their counterparts - e.g. the Iron Age people/communities who needed to settle the land for ploughing, grazing etc. In the coastal regions, sand dunes sometimes become impediments in locating LSA sites. Owing to all these factors the preservation state of the LSA archaeology is often poor and not easily discernible (e.g. Deacon & Deacon 1999). Caves and rock shelters provide a more substantial preservation record of pre-colonial record of indigenous people's archaeology. This is in a form of stone artefacts, rock art and other material culture such as beads etc. The LSA archaeology was, however, not only dominated by the San hunter-gathers - in about 2 k.y.a the southern Africa landscape is known to have also been penetrated and occupied by the Khoekhoe pastoralists/herders who introduced sheep and cattle. Further north of the Gauteng Province the Limpopo Province is well known for sites that document the existence of Khoekhoe herders in South African landscape (e.g. Hall & Smith, 2000). This group of people is also recorded in provinces such as the Cape. It would mean that they would have passed through the western and central provinces of Gauteng before reaching the Cape Provinces. Ceramic vessels are some of the material culture that signifies the Khoekhoe material culture in archaeological records – including the depiction of sheep and cattle often found in San hunter-gather rock art (ibid). Smith and Hall (2000) give detailed descriptions of potential relations that could have taken place between the San, the Khoekhoe and later the Iron Age farmers in Little Mock - an archaeological interaction site located in the Limpopo Province near the Soutpansberg Mountain north east of the current study geography. In their study, Smith and Hall, argue that the material culture of the Khoekhoe herders included among other things the art of making rock art in form of geometrics, concentric circles etc. Binneman (et al. 2011) asserts that the diet of this new group of people would have also included muscle collected

along the muddy river banks, coastal line and riverine and terrestrial foods. Other than the material culture such as artefacts found within the LSA industries, burials or human remains become dominant in the landscape. In the coast they are often found buried underneath middens (dumpsites) (e.g. Deacon & Deacon 1999). While in the interior and northern regions such as the Limpopo Province they are sporadic and can occur across various features in the landscape.

The LSA archaeology is therefore rich and varied consisting of stone artefacts, other forms of material cultures such as beads (ostrich egg shell beads are dominant), pottery, rock art in form of paintings and engravings with engraving dominating the central low land and the interior regions of the country. Engravings associated with this period spread across the Highveld and in regions such as the North West Province, the Free State Province and the Cape provinces such as the Northern Cape - better known to archaeologist as the "Mecca" of engravings sites in South Africa and most probable in southern Africa. Within the province of Gauteng LSA sites have been recorded in and along the Magaliesburg, Melville Koppies, rock art site of Redan in Vereening. Melville Koppies is within reach to Braamfontein PRASA depot.

2.1.2. Iron Age Archaeology:

The Gauteng Province is probably the second/third best known region in terms of Iron Age archaeological research after the northern regions of Limpopo, Mpumalanga and North West Provinces. Like the Stone Age archaeology, in the Gauteng Province (and other South African province) this period in archaeological records is divided into three categories, namely the EIA (Early Iron Age), MIA (Middle Iron Age) and the LIA (Late Iron Age) (e.g. Huffman, 2005). While in regions such as the Free State Province there is no clearly defined MIA (e.g. Tomose, 2013).

The EIA communities first appear in southern African archaeological records in the 1st Millennium AD (Huffman 2007; van Schalkwyk, 2007). The eastern regions of the country were their preferred regions because of their rainfall patterns – summer rainfall climates conducive for ploughing and growing crops like maize, sorghum and millet. In the interior regions, the former Transvaal areas of Limpopo and Gauteng Province alike were preferred. Therefore the Gauteng and the Limpopo Province provide a rich canvas of all three Iron Age periods- providing archaeologists' with a unique cultural landscape. In these regions most of

Iron Age sites occur near the flood plains, along and near some of the major rivers however, some are known to occur in defensive slopes along some of the hill slopes and/or mountainous areas (e.g. van Schalkwyk, 2007; Huffman 2007 also see Hall & Smith 2000).

Huffman (2007) and van Schalkwyk (2007) dates many of the Iron Age sites located north and north east of the current study region - in Limpopo Soutpansberg Mountains, early in the Iron Age period when the Early Iron Age (EIA) proto-Bantu-speaking farming communities began arriving in South Africa which was then occupied by hunter-gatherers (Hall & Smith, 2000). For example, van Schalkwyk (ibid) date early known Iron Age site to 200 AD. These EIA communities are grouped into what archaeologists referred to as the Kwale branch of the Urewe EIA Tradition (Huffman, 2007: 127-9). A distinction between the Iron Age and the LSA is drawn on the basis and on the fact that the Iron Age communities occupied the foot-hills and valley lands introducing sedentary settled life, domesticated livestock, crop production and the use of iron (Maggs 1984a; 1984b; Huffman 2007, van Schalkwyk, 2007). Stonewalls are one of major characteristic of the Iron Age people. However, they are not the only characteristic or feature. Huffman (1982), for example described cattle dug, both vitrified and unverified, as one of the Iron Age traits. He also includes pits and burials, with some located inside the cattle kraals (ibid). This would have varied from cultures to cultures and traditions to traditions. For example, alongside the Urewe Tradition is the second group called the Kalundu Tradition whose EIA archaeological sites have been recorded in most of South Africa's northern and central regions. These are therefore some of the important Iron Age traditions in the EIA.

The MIA in the province date between AD 900 and 1300. This period is concentrated in the Shashe-Limpopo basin where the first complex society in southern Africa developed. Like in the earlier periods, during this period sporadic settlements would have been found along the Limpopo River to Botswana and some as far as the North West Province. What is today the Gauteng Province was also not spared from diffusion and expansion of the MIA people and ideas. The complex society in the Limpopo Shashe basin is distinct from other settlements in the Iron Age in that it was "characterised by sacred leadership and distinct social classes, ...[creating] the first town, first king, first stone-walled palace and the capital of the first state" (Huffman, 2005: 7). Known capital that develop during the MIA is Schroda (AD 900-1000), K2 (1000-1220) and finally the well known and popularised site of Mapungubwe (AD 1220-1300). Mapungubwe discoveries have contributed to the Limpopo Province becoming known as the province were the famous golden rhino that was recovered from the late MIA early LIA settlement site of Mapungubwe in the Limpopo Shashe Confluence Area Valley (Murimbika & Tomose, 2012). The Iron Age communities are also known to have also practice the tradition

of making rock art, especially during the last period of the Iron Age i.e. the LSA. A period characterised by the different encounters between these communities and the colonial settlers. Other than rock art, stone walls and pottery – the material culture of the Iron Age communities also includes Iron Implements, traded beads, rainmaking site features, spear sharpening grooves on rock surfaces, grinding stones etc (e.g. Huffman, 2007). South of the CoJ Iron Age sites are found in Klipriviersberg - for example in Klipriviersberg Nature Reserve as well as Melville Koppies in Melville (e.g. e.g. Mason, 1997). The Highveld late Iron Age period is associated with, among other groups, the Sotho-Tswana people and later by the Ndebele people.

2.1.3. Historical Archaeology:

The Historical archaeology is a period in archaeological records that refers to the last 500 years in archaeological records. This period encapsulates the Late Stone Age, Late Iron Age, and the period of European settlers and/or "colonist" in southern Africa. The archaeological records that characterises this period includes ruminants of Stone Age industries (and material culture), the Late Iron Age material culture (e.g. pottery/ceramics, iron age implements etc) and built environment (e.g. elaborate stone wall settlements etc) and the settlers material culture and built environment. In other regions of the country, settler towns become a dominant form of built environment and landscape features. Within Gauteng Province and our study area the settlers are dated to 1840s. Palestrant (1986) places the date for the Voortrekker's in the Witwatersrand to 1830 and a date of 1842 for one of the earliest established farms which later became Johannesburg: "The part of the Highveld which was eventually to become Johannesburg had at the time few established farms. One of the earliest was situated at Klipriviersdale and belonged to the Meyer's family who had settled there in 1842. Their nearest white neighbours were miles away – the Marais, beyond Heidelberg and the Erasmus and Strydoms families, near Olifantsfontein" (Palestrant, 1986: 8). In this province, the earliest towns were established by the European settlers of Dutch descent – the Afrikaans communities after they Trekked from the then Cape Colony to avoid British Administration in the 1930s and 19840s. They fall within what was then called the Transvaal - direct translation for "across the Vaal River". During the Great Trek these Afrikaans communities, commonly referred to as the Boers (farmers), who left the British Administration of the Cape Colony (i.e. a former Dutch colony in 1795 and again in 1806) established several republics north and north-west of the British Colonies - these republics included the Boer Republics of the Orange Free State (1845) and the Transvaal across the Vaal River were our

study area is located. The Transvaal which had different autonomous and separate states which were later united to form what became known as the Zuid Afrikaanse Republiek (South African Republic) the ZAR (Celliers, 2010) .

Throughout the middle of the 1800 Century AD the Gauteng Province witnessed range of settlement patterns- the occupation and reoccupation of the region by the different culture groups that contributed to the contemporary peopling of the present day Gauteng Province (Tomose, 2012). There are various factors that contributed to this historical times settlement of the region. The first has to do with the availability of natural resources and the second is political driven. For example, the Great Trek is a political motivated movement of people that influence the peopling of Gauteng Province by the settlers during the 1800s. However, the attraction of people to natural resources available in this province date as far back to Iron Age archaeological period. During the historical period the availability of natural resources also played a pivotal role in the choice of settlement of people, based not only from a subsistence point of view but also driven by commerce or commercial gains resulting from the exploitation of available natural resources such as gold discovered within the Witwatersrand particularly after the discovery of gold in 1884. The founding of Johannesburg (where are current study is located) is a direct consequence of the discovery of gold. The same is true for the establishment and the development of the railway industry within the Witwatersrand, Gauteng Province, South Africa. This brings us to exploring one of archaeological component or subfield called industrial archaeology which is directly relevant to the current study of Braamfontein PRASA depot and the landscape in which it is located, the CoJMM one of Gauteng Provinces metropolitan landscapes. An urban and modern landscape which came about the industrial revolution in South Africa during the 1800s. This particular subfield of archaeology helps are to deal with the with the built environment and landscape on the Braamfontein PRASA depot.

2.1.3. Industrial Archaeology: the South African Railway Industry and Implication for Braamfontein PRASA Depot, CoJMM, Gauteng Province.

The Railway Industry:

South African has long history of the railway industry compared to many countries located within the SADC block. It is in fact the mother country for the development of the railway industry in this socio-economic block. The first steam train in South Africa was development in Durban in the 2nd half of the 1800s - the train (called the Durban) made its official journey

between Durban and the Point on the 26 of June 1860 (Kemmerling, 1997; Day, 1963). The Durban covered a distance of only 3.2 km and it has been said that the journey only took approximately 5 minutes (Day, 1963) (Figure 2). This development led to a wider development of the railway industry in the country. It took another two years before other trains were launched in the country. On the 13 February 1862 Cape Town and Eeste River launch their own trains. However, it has to be noted that the plans in the Cape of Good Hope to launch a railway industry in South Africa had long started before the first train launch in Durban in 1860. For example, "in 1828 the Cape Town Chamber of Commerce suggested to the Cape Colonial Government that a railway, or series of wooden ways, should be built on Cape Town wharf so that casks of wine and brandy could be rolled along them to the ships which would take them overseas" (Day, 1963: 11). This can be interpreted as the first strategic move to the development of the industry in the country. It took another 17 years, in 1845 to register a the first South African railway company - the Cape of Good Hope Western Railway (Ltd) with it Chairman Mr. Harrison Watson (Day, 1963). Mr. Watson was a banker and merchant by profession and he announced the same year (on the 17 October) that his company planned a railway and that "[The]Railway is calculated to be of immense benefit to this flourishing Colony; and as it is confined to the more populous districts in the neighbourhood of Cape Town, the enterprise is certain to return ample remunerative profits to the shareholders" (ibid:13). However, the reaction to this announcement was rather negative. The promoters of this company had named the Attorney-General of the Cape Colony, the Honourable William Porter, as their legal adviser without properly consulting with him on the subject. Porter refused the invitation and was of the view the attempts were fatal and hopeless. Eventually the plans were put on hold. It took another 6 years since the launch of South Africa's first train in Durban, and 4 years for the Cape launch, for South Africa to take significant strides in the development and expansion of the industry. The first expansion took outside the Cape to other provinces took place with the discovery of the diamonds in Kimberly in 1866. The railway lines developed from Cape Town to De Aar Junction and Kimberley. Following the discovery of gold in the Witwatersrand in 1884, by Jan Gerrit Bantjes on the Farm Vogelstruisfontei, thee railway infrastructure developed into the Transvaal. During this time other railway lines had developments had been taking place from the east coast of East London and Port Elizabeth in the modern day Eastern Cape Province into interior regions of the Northern Cape Province along the Naauw Poort Junctions south (and some tens of km's) of the town of Coalsburg in Northern Cape. How the railway industry finally got to the Witwatersrand becomes interesting for this study.

Following the successful operation of the railway line systems in both Natal and the Cape it was eventually decided by the Cape Government to form a railway company, the Cape Government Railways, that would Link-Up the Cape with the then two Boer Republic's of the Orange Free State and the ZAR ((Zuid-Afrikaansche Republiek), later the Transvaal and now the Gauteng, Mpumalanga & the Limpopo Provinces). It also aimed expanding to the Natal Colony in order to extend the British Imperial Sovereign Power over the southern tip of southern Africa. This was to prove not an easy task to accomplish because the ZAR government had strong anti-railway sentiments [but most importantly the Cape and its politics] (e.g. Kleinsgeld, 2003). There were also many frontier wars during this period for the construction activities to go ahead smooth as planned.

The recorded date for the first concessions to build a railway line in the ZAR is 1872 (on the 26 August) – a concession issued by Mr George Pigot Moodie. The first proposed railway line was to cover a total distance of 16 miles (way longer than the Durban first railway line and shorter than the first Cape Town line) between Johannesburg metropolis and coal mines (Kleinsgeld, 2003; Richardson & Van-Helten, 1980). The line was completed in 1890 and named the Rand Tram, but was in actual fact a fully flagged railway line (ibid). In the same year the line extended to Krugersdorp, some 20 miles west of Johannesburg and from Boksburg to springs. Two years later (in 1892) the 'Railway Link-Ups' between the Cape, the Orange Free State and the ZAR were to begin (Kleinsgeld, 2003). By September 1892 the Cape Government Railways had built two railway lines starting from Port Elizabeth and East London on the east coast of the Cape Colony and they had advanced as far as Bloemfontein of the Orange Free State (e.g. see Figure 4 - for Eastern Central & Far Eastern Railway Lines as well as the Cape Western Line). According to Kleinsgeld (2003) both the Bloemfontein and Cape Town lines reached the Transvaal or the ZAR opening three ports in the Rand gold fields. Burman (1984) gives an interesting insight into the development of the Eastern Cape railway lines Northern Cape then Bloemfontein. He asserts that these lines were to serve among other Cape Colony objectives: the eastern frontier wars with the network for military forts and strategically the port of East London was chosen partly for being the closest port to the frontier for landing and transporting troops. The construction of this railway line begun with the Molteno Government Administration in 1873 and finally reaching Queenstown in 1880 as a result of continuous frontier disruption (Figure 3- portrait if Molteno).

It is a known fact that the Cape Colony was encouraged to expand the Cape Western line to Kimberley following the discovery of diamonds and subsequently the Kimberley rush in 1871 (e.g. Kleinsgeld, 2003). The work to construct this line began in 1873, reaching Kimberley in

1887. The same is true for the Cape Eastern lines (i.e. the Port Elizabeth and East London lines respectively) which eventually reached Bloemfontein and later the Transvaal (ibid). Burman (1984) is correct to link the lines to frontier, but it is argued here that they were mostly directed at serving the commercial interest which came about with the discovery of mineral resources in both the Northern Cape town of Kimberley and the Transvaal gold fields – particularly with the discovery of gold in the Transvaal in 1884 setting off the Witwatersrand Gold rush (e.g. Richardson & Van-Helten, 1980). Following the discovery of gold in the Witwatersrand, the Cape government and the government of the Orange Free State (OFS) reached an agreement by which the Cape Government Railway would build and operate a railway line through the Orange Free State to the rapidly-growing City of Johannesburg, along the gold bearing reefs of the Witwatersrand (ibid). This line reached Bloemfontein (the capital of the OFS) in 1890, and the first trains operated from Cape Town to Johannesburg in 1892 (ibid). The agreements signed between the Cape Government and the Free State under the leadership of Prime Minister John Molteno who planned an enormous network of railway lines to connect the Cape Colony many ports to its interiors and importantly its diamond and later gold fields (ibid).

Below are some of the railway companies that developed in South Africa to-date:

Year	Company Name	Modern day South African Province
1862	-Cape Town Railway and Dock Company	Western Cape
1890	Rand Tram	Gauteng
1892	The Link-up Begins (East London & Port Elizabeth, Cape Colony)	Eastern Cape, Western Cape, and Northern Cape
1894	Nederlandsche Zuid Afrikaansche Spoorweg Maatschappij	Gauteng
1898	The Link-up Completed	Eastern Cape, Western Cape, Northern Cape, Free State and Gauteng
1900	Imperial Military Railways	Free State and Gauteng
1902	Central South African Railways	Free State and Gauteng
1916	South African Railways and Harbours	South Africa (all provinces)
1981	South African Transport Services	South Africa (all provinces)
1989	Privatisation ("Legal Succession to the South African Transport Services	South Africa (all provinces)

	Act, 1989" transformed the South African Transport Services from a government department into a public company)	
1990	Transnet	South Africa (all provinces)
In 1997 the subsequent formation of the various Parastatal which include Transnet, PRASA (Metrorail) etc		

The development of Braamfontein PRASA depot has to be understood within the broader context of the development of the railway industry in South Africa and ultimately our study area - Braamfontein PRASA depot.

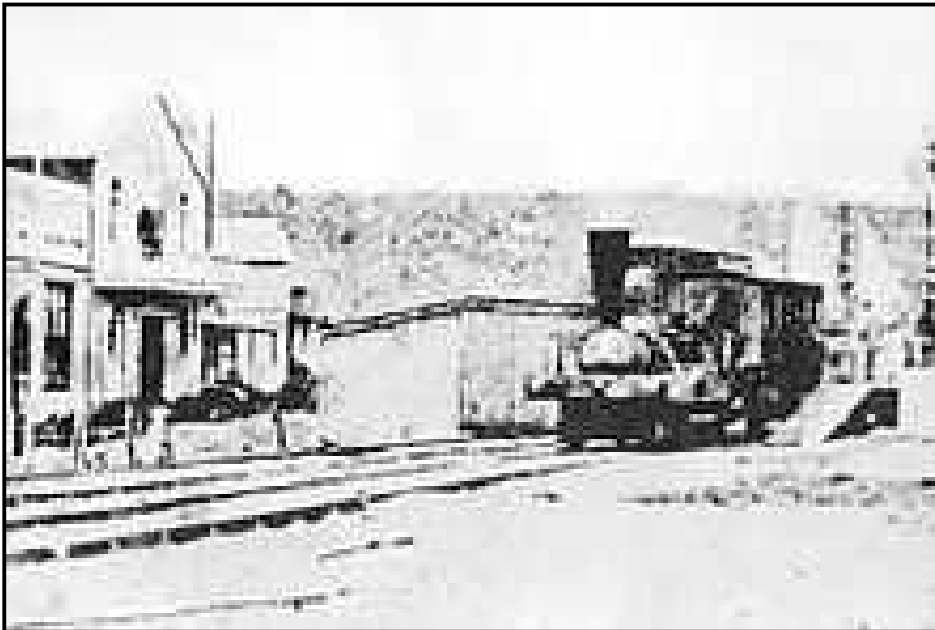


Figure 2-The Natal arriving at Point Station, 26 June 1860

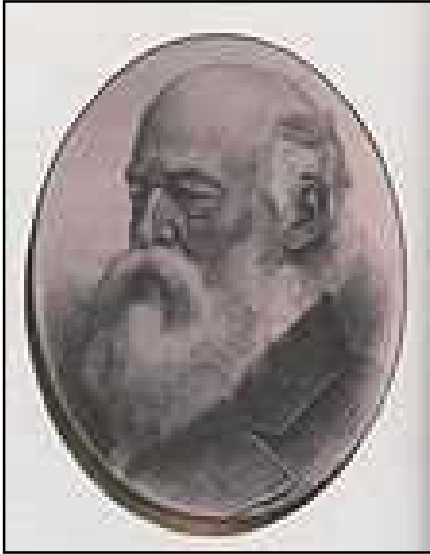


Figure 3 -Prime Minister John Molteno.

http://en.wikipedia.org/wiki/Cape_Government_Railways#CITEREFBurman1984 (16/07/2012)



Figure 4 - Railway lines from the Cape Colony which eventually led to the establishment of the railway in the Transvaal, ultimately Johannesburg our study area

Johannesburg: Newtown and the Braamfontein Depot

Johannesburg developed in 1886 as a mining camp following the discovery of gold along the gold bearing reefs of the Witwatersrand. It grew steadily from a humble mine camp with no name to a fast growing town. By 1896 Johannesburg had already developed into a formidable town (Figure 5). Our study area is located on the western-end of the CoJ CBD one of CoJMM municipalities. Here, Braamfontein is located north and north-west of the Newtown Cultural Precinct and south of Braamfontein. Both these geographic areas (Newtown Cultural Precinct and Braamfontein) have long and complex history and our study area (the depot) is entangled in that historical context or legacy, particularly to that of Newtown of Cultural Precinct, former Brickfield. According to a website dedicated to Newtown heritage and history (<http://www.newtown.co.za/heritage/history/July/> 2013)

"'Newtown' was adopted by city administrators in 1904 following the clearance of Brickfields and other multi-racial 'slums' in Johannesburg's first forced removal. Situated west of Diagonal Street and beyond the borders of the original mining town, this racially diverse area incorporated parts of Brickfields, Aaron's Yard and the Indian (or 'Coolie') location. In 1904 this 'new town' was redesigned as a commercial and industrial area to maximize the nearby goods-yards. In the plans for Newtown the strict grid pattern of the CBD has been adopted. The destruction of Brickfields and subsequent development of Newtown was an attempt by the post-South African War administration of Lord Milner to refashion Johannesburg along 'modern' lines. This involved formalising the townscape, developing infrastructure and strictly enforcing racial segregation".

Newtown has recently being proclaimed by the CoJ of Johannesburg as one of its cultural. A hub for cultural, creative and artistic projects and programmes. Among some of the well known places in Newtown is the world known and famous Market Theatre (to many known associated with the protest theatre), Museum Africa located in the old Market Building shed and a variety of other entertainment venues. The historic Mary Fitzgerald Square (former Market Square) is one of the significant landmark features of Newtown (Figure 5). Others include the recently launched Workers Museum south of the Square. Without going to details about the Newtown Cultural Precinct venue or landmarks it is worthy but to name a feature in order to contextualise our study. The Newtown Cultural Precinct can effectively be divided into

4 sub-precincts for the purposes of this study but without taking anything away from its existing Spatial Development Framework:

1. North of Mary Fitzgerald Square, the Market Precinct, the following historic sites are found:

The 1913 Market Building is found and is home to the Market Theatre and Museum Africa.

2. North of the Market building, north-eastern to the north-western quadrants of Newtown Carr Street connects the Brickfields and Kazerne with the Milling Precinct, home to the old Premier Milling complex on Quinn Street. Our stud areas is located just behind and north of the Milling Precinct (Figure 5).

3. South of the Mary Fitzgerald Square the Electric and Workers Precinct founding and it contains the following landmarks: the Workers Compound (newly launched Workers Museum), the Turbine Hall, the Electric Workshop, Sci-Bono centre and the South African Breweries Museum. Lastly

4 the Transport Precinct incorporates the South African Reserve Bank, the Bus Factory, Transport House, the City of Johannesburg's Directorate of Arts, Culture and Heritage (housed in what used to be offices of the city's transport department) and the M1 freeway".

The railway line divided located north of Newtown form a buffer between Newtown and Braamfontein in the north (Figure 5 & 9). Our study area is ensconced between the two districts of Johannesburg.



Figure 5- 1920 Insurance Plan of Johannesburg showing the Market Square (red arrow), S.A. Railway Goods Depot-Yard & Sheds (blue arrow), Braamfontein cemetery (brown arrow). Braamfontein Depot (yellow stippling not to precision)

The founding of Newtown is associated with two of former Johannesburg prominent figures, Lord Alfred Milner and Lionel Curtis. They are argued to have been behind the conceptual planning and subsequently the construction of Newtown. The Newtown historic and heritage website summarises their biographies as follows

(<http://www.newtown.co.za/heritage/history/July/> 2013):

"Lord Alfred Milner, 1st Viscount (1854 - 1925) was a leading British statesman and colonial administrator who played a significant role in the redevelopment of South Africa following the South African War (1898 - 1902). While serving as High Commissioner, he became associated with a group of members of the South African Civil Service known as 'Milner's Kindergarten' - mostly personal and Oxford connections who occupied senior positions in his administration. Milner retired as High Commissioner in 1905. From 1916 to 1918 he played a prominent role in British politics."

Lionel Curtis (1872 - 1955) was a notable member of Milner's Kindergarten. He was a strong proponent of British Empire Federalism and in 1901 became Town Clerk of Johannesburg, where he initiated a number of reform projects to modernise the administration of the City. Under his administration electrical tramways were introduced to replace horse-drawn trams. Curtis also played a prominent role serving on the Johannesburg Insanitary Area Improvement Scheme Commission and was a proponent of the clearance of Brickfields in favour of the redevelopment and industrialisation of Newtown.

The work of the above two gentlemen, regardless of its shortcomings in terms of properly addressing the socio-political issues associated with the development of Newtown such as the forced removals, seem to have significantly contributed to the shaping and development of Johannesburg as a key role player in the South African commerce at the time. Not to mention its own development and provision of proper infrastructure able to support its commercial needs. It is therefore concluded that Newtown does really indeed offer. They are, however,

ever also remembered with the introduction of segregationist policies that would later inform the Town Spatial Planning along the racial and ethnic lines (e.g. Figure 8). And that cannot be divorced from their legacies. It is concluded that Newtown "offers a unique insight into the development of Johannesburg and modern South Africa as well as the key social, political, industrial, artistic and cultural trends that have come to be associated with Johannesburg's evolution from a Victorian mining camp [Figure 7 -mining related] to one of the world's major urban centres. Newtown also provides an understanding of how wider industrial and political forces came to disrupt and destroy poorer communities from racially mixed backgrounds – sometimes carried out in the name of urban regeneration while essentially serving colonial and apartheid racial policies" (idem)



Figure 6 - Johannesburg by 1896 (Wikipedia, July, 2013)



Figure 7-Mining Boys on the Rand, Johannesburg. C1903-1920. Source: Franco Frescura Collection (accessed from SA History Online, July, 2013).

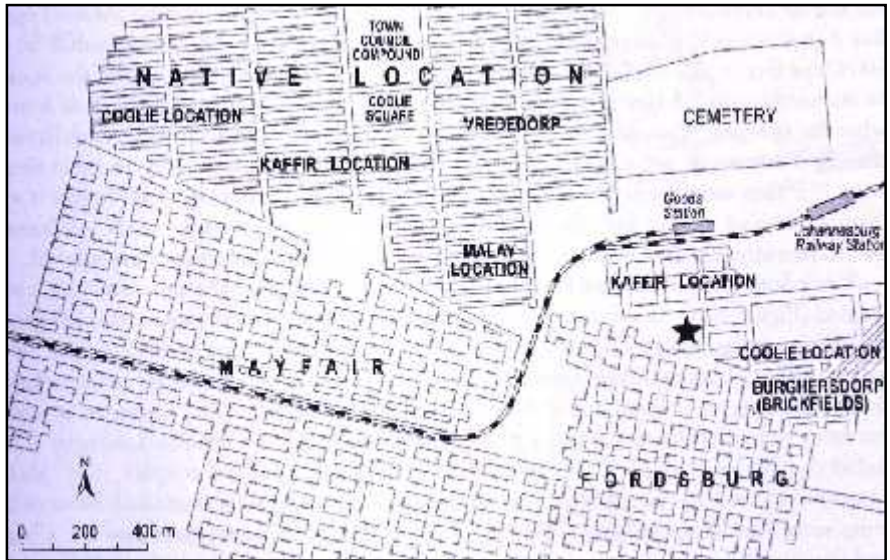


Figure 8- Map showing some of Johannesburg locations divided according to racial lines

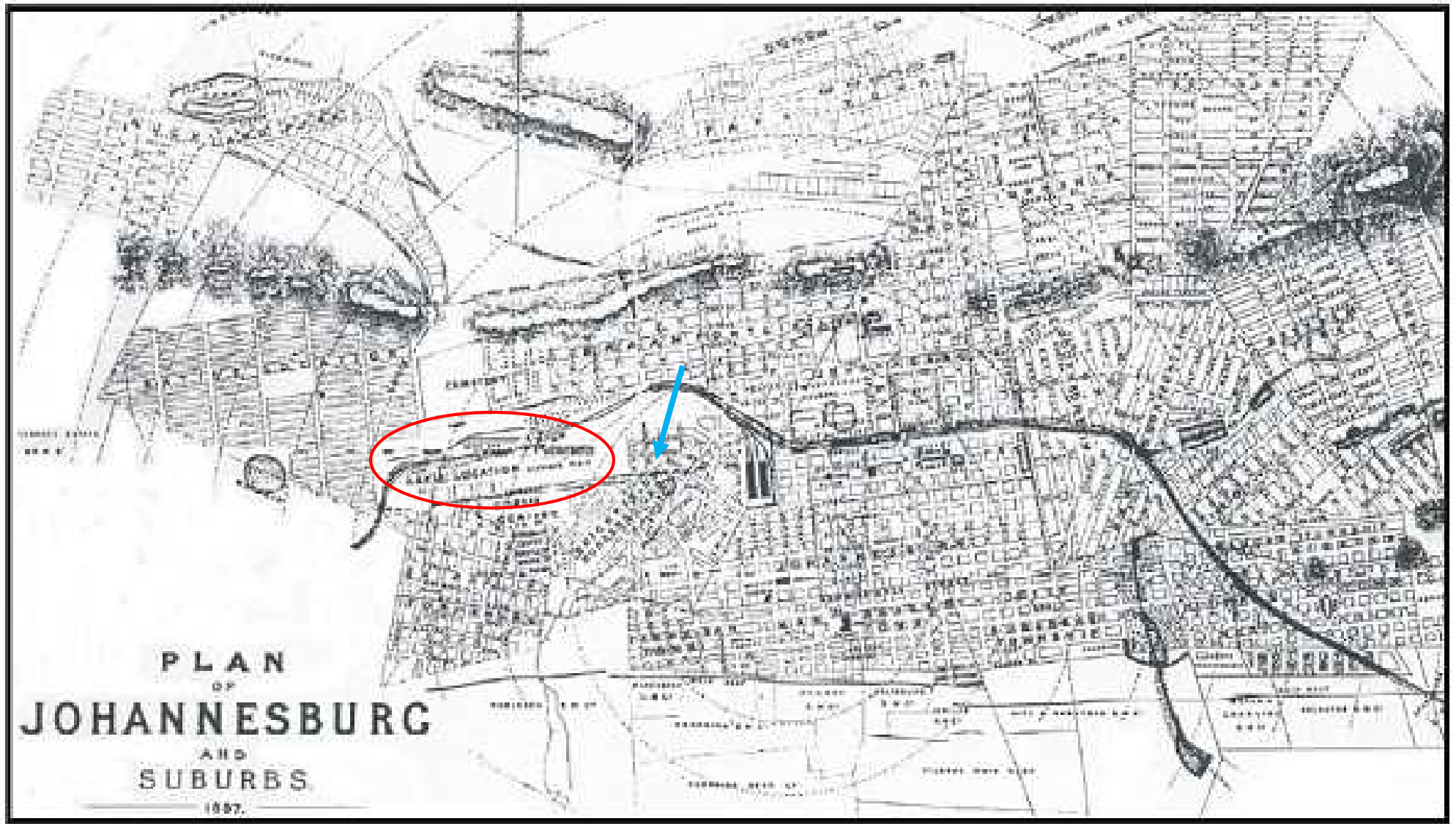


Figure 9- 1897 Plan of Johannesburg and suburbs. The Braamfontein PRASA depot is indicated by the red circle and the suburb of Brickfield proximity (location) to the depot is indicated by the blue arrow. Image (<http://www.newtown.co.za/heritage/history>, July 2013)



2.2. Description of the affected environment

Table 1 -Braamfontein PRASA Depot, CoJ, Gauteng Province, South Africa

<p>Location</p>	<ul style="list-style-type: none"> The project area is located in Braamfontein one of the CoJ business district/zone (and its headquarters), Johannesburg, CoJMM, Gauteng Province of South Africa. The total depot covers over 30 hectares and approximately only 17hectares are earmarked for the proposed development and a total length of over 800m (Figure 11) The site centre GPS Coordinates are: 26° 11' 58.70"S 28° 01' 29.46"E
<p>Surrounding Towns/Townships/Industrial Zones/Villages</p>	<ul style="list-style-type: none"> The study is ensconced between Newtown Cultural Precinct or the Newtown Mix Used Residential and Business Zone (south) and Braamfontein (north). Braamfontein is the headquarters for the CoJMM administration (Figure 10). The suburb of Burghersdorp is found on the south-western end of the study area (Figure 10). North-west are the suburbs of Vrededorp and Pageview (Figure 10)
<p>Land Uses in and around the study area</p>	<ul style="list-style-type: none"> Railway industry - PRASA Braamfontein depot for train maintenance. (Government Parastatals) (Figure 10 & 11) Residential (suburbs of Burghersdorp; Vrededorp; Pageview; Newtown) (Figure 10) Burial Grounds - Braamfontein Cemetery Moses Mabida and Kings Park Stadium, Durban beach (Figure 10) Commercial/Entertainment- Newtown, Braamfontein (Figure 10), National/Provincial roads such as the M1 Local roads/streets: Burghersdorp St (south-west), Nemi Piliso St (east), Seven St (north), Carr St (south), and Subway St (west)
<p>Land Owner in and Around(s)</p>	<ul style="list-style-type: none"> Site- PRASA for the Braamfontein Depot Government - CoJMM (around) Private -residential and commercial sites (around)
<p>Current Conditions (on site)</p>	<ul style="list-style-type: none"> In terms of the natural environment the site is highly disturbed landscape - with railway infrastructure (Figure 10 & 11). In terms of cultural heritage (industrial archaeology; built environment & landscape) the site provides a unique historic

	industrial built environment and landscape (Figure 15)- gives a detailed list of industrial built environmental features found on site
Applicant	<ul style="list-style-type: none"> • Ecosolve Consulting on behalf of PRASA
Proposed Development	<ul style="list-style-type: none"> • Upgrade and maintenance of Braamfontein PRASA depot
Access	<ul style="list-style-type: none"> • Existing national, provincial and local roads, routes and human foot paths e.g. <ul style="list-style-type: none"> ○ National/Provincial roads such as the M1 ○ Local roads/streets: Burghersdorp St (south-west), Nemi Piliso St (east), Seven St (north), Carr St (south), and Subway St (west) The M4 east of the site and R102 in the west with M17 cutting across
Defining natural features	<ul style="list-style-type: none"> • None - urban setting
Zoned for	<ul style="list-style-type: none"> • Railway

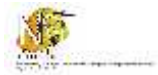


Figure 10 - General location of the study area in relation to the suburb of Springfield, Durban beach and Casino/Mall, Moses Mabida and Kings Park Stadium. Durban beach and the ocean are the important natural landmark features. The site is ensconced between the M4 (east), R102 (west) and M17 cutting across .

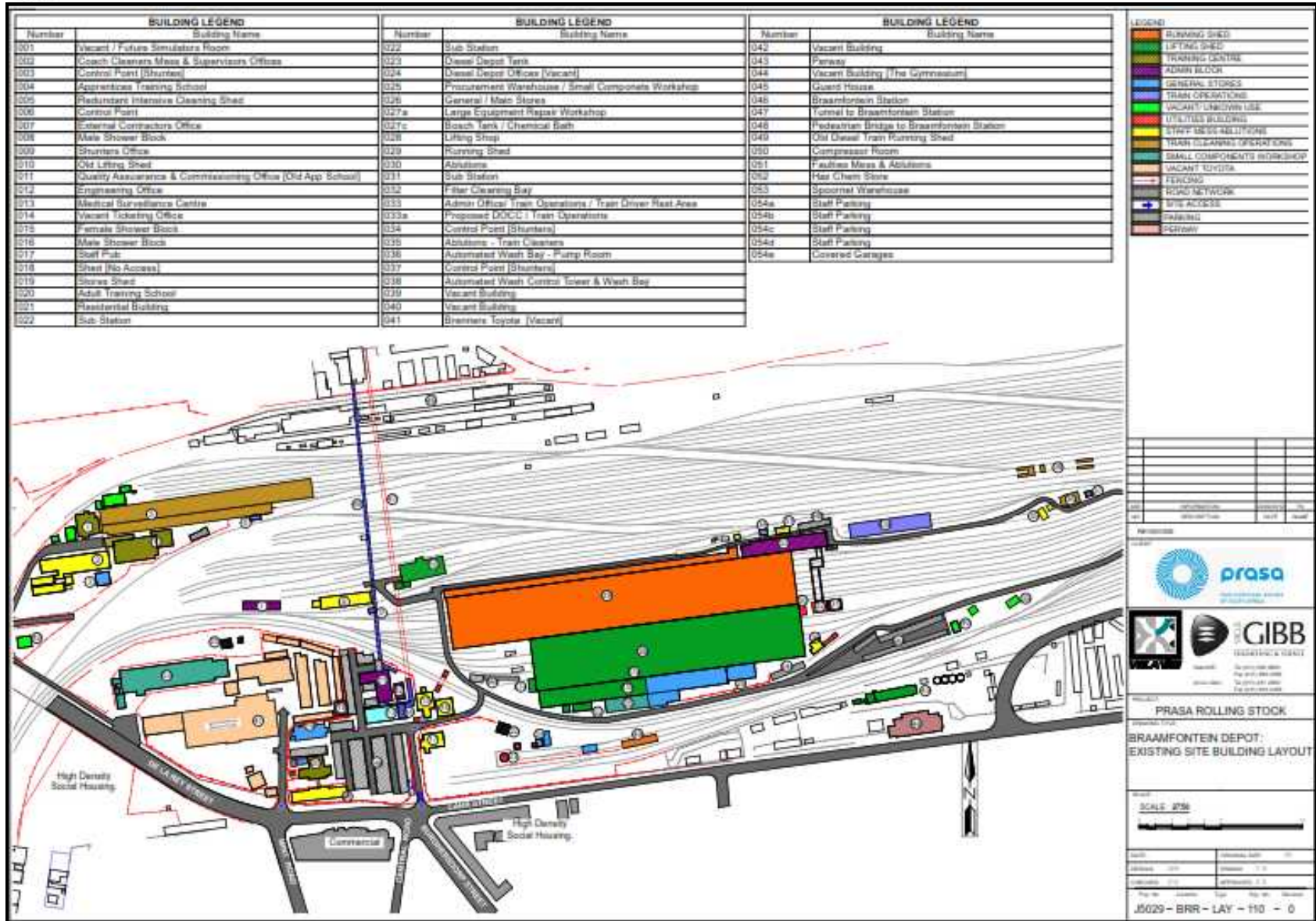


Figure 11- List of the existing infrastructure at Braamfontein PRASA Depot



2.2. Description of proposed activities: Infrastructure Proposed

Table 2 - List of Activities

Activity 1	<ul style="list-style-type: none"> • Upgrade and maintenance of Braamfontein depot buildings and railway infrastructure
Activity 2	<ul style="list-style-type: none"> • Clearing of access roads and bulk infrastructure to support the newly proposed Braamfontein depot buildings and railway infrastructure .

2.3. Needs and Desirability

Table 3 –List of activities in-line with the project scope

Activity 1	<ul style="list-style-type: none"> • Desktop study of the heritage value and integrity of the area under consideration and its surrounding with a particular focus on resources within Braamfontein PRASA depot (refer to 2.4 below for detailed overview of resources in the region under consideration). • Physical identification, documentation and recording of cultural resources within the proposed development area (Braamfontein depot).
Activity 2	<ul style="list-style-type: none"> • The mapping, assessment and evaluation of the heritage value and integrity of the identified heritage resources and assessment of potential impacts as a result of the proposed development on these resources.
Activity 3	<ul style="list-style-type: none"> • Proposing heritage management measures for inclusion in the BA and later EMP document • Making recommendations to SAHRA and provincial heritage resources authority - PHRAG

3. METHODOLOGY

This chapter outlines the methodologies used in conducting the HIA study for the proposed Braamfontein PRASA depot upgrade and maintenance project. The study area is located within CoJMM. This is done in accordance to the Terms of Reference provided by the client for the

appointment of heritage specialist and completion of this study. However, some areas of the report follow minimum standards for completion of professional HIA as stipulated in SAHRA minimum standard (2012) such as detailed account to the archaeological and historical background of the study area or region.

3. 1. Step I – Literature Review (Desktop Phase):

- Sources used in this study included, but not limited to published academic papers and HIA studies conducted in and around the region where the current development will take place.
- There was limited use of archival maps -one historical map and one archaeological map and one general travel map showing the proposed area of development and its surround were assessed to aid information about the proposed area of development and its surrounding.
- The above also included a review and assessment of relevant environmental and heritage legislations such as the NEMA (together with the 2010 EIA Regulations) and the NHRA.

3.2. Step II – Physical Survey

The physical survey of the study area aimed to address the following main areas of concern raised by the client in the specialist Terms of Reference:

1. To conduct an onsite verification survey for the proposed Braamfontein PRASA depot upgrade and maintenance project area.
2. To identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located on the proposed Braamfontein PRASA depot upgrade and maintenance project area. Use will be made of an notated maps where appropriate.

In order to address these concerns:

- The physical survey of the proposed Braamfontein PRASA depot upgrade and maintenance project area was conducted between 31 May 2013.
- The survey covered an area of approximately 40ha - on foot and track logs of the survey were recorded using Garmin GPSmap 62s.
- The objective of the survey was to locate and identify archaeological and heritage resources and/or sites and objects, occurrence within and immediately outside the proposed development footprint. To record and map them using necessary and applicable tools and technology.

- The physical survey was deemed necessary since the desktop phase of the project yielded few known archaeological resources and other heritage/historic resources about the region in which the current study area is located. The survey also paid special attention to disturbed and exposed layers of soils as such as eroded surfaces because these areas are more likely to be exposed or yield archaeological and other heritage resources that may be buried underneath the soil and be brought to the earth surface by animal and human activities such as animal burrow pits and human excavated grounds. The edges/sides of dirt roads were also inspected for possible Stone Age scatters as well as exposed Iron Age implements and other resources. Drainage and ephemeral wash were also investigated for resources.
- The following technological tools and platforms were deemed important for documenting and recording located and/or identified sites:
 - Garmin GPSmap 62s – to take Lat/Long coordinates of the identified sites and to take track logs of each of the three corridors.
 - Lenovo ThinkPad aided with Garmin Basecamp Software, Google Earth – to plot the proposed corridors.
 - Quantum GIS Lisboa (1.8.0) was used to plot all the identified features and/or resources and to develop heritage maps in order to inform the heritage analysis of the proposed Braamfontein PRASA depot upgrade and maintenance project area.
 - Maps provided by the client before the survey also proved invaluable
 - Survey coordinates and data provided by the client were used to map the development area footprint.
 - Samsung camera – was used to take photos of the affected environment and the identified heritage sites.

3.3. Step III – Data Consolidation and Report Writing

During field work and on the return from the field the following were addressed:

1. Assessment
of the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value"
2. Description of possible impact of the proposed development on these cultural remains, according to a standard set of conventions;

3. Proposal of suitable mitigation measures to minimize possible negative impacts on the cultural resources;
4. Review of applicable legislative requirements - Section 3.1. of this Chapter (i.e. Chapter 3) addresses this concern as well as Section 5.5 of Chapter 5 discusses Sections of the NHRA, No. 25 triggered by the current study findings
5. Highlighting of assumptions, exclusions and key uncertainties". Chapter 4 (below) of this report address this concern.

The final step involved the consolidation of the data collected using the various sources as described above. This involved the manipulation of data through Quantum GIS. Assessing the significance and potential impact of the identified sites, discussing the finds, report writing and making recommendation on the management and mitigation measures of the identified sites and resources as well as the impact and influence of these sites and resources on the proposed corridor.

3.4. Assessment of Site Significance in Terms of Heritage Resources Management Methodologies

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context)
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures)
 - Density of scatter (dispersed scatter)
 - Low - $<10/50\text{m}^2$
 - Medium - $10-50/50\text{m}^2$
 - High - $>50/50\text{m}^2$
- Uniqueness and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

- A - No further action necessary;
- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate pylon position
- D - Preserve site, or extensive data collection and mapping of the site; and

- E - Preserve site
- F - Impacts on these sites by the development will be evaluated as follows:

Measure of Heritage Sites Significance

The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by the ASAPA for the SADC region were used for the purpose of this report.

Table 4: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	Grade 3C	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	Grade 3D	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	Grade 3E	Low Significance	Destruction

3.5. Methodology for Impact Assessment in terms of Environmental Impact Assessment Methodologies including Measures for Environmental Management Plan Consideration

The determination of the effects of environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the BA. The impact evaluation of predicted impacts was undertaken through an

assessment of the significance of the impacts. This is in line with specialist requirements as required by the client. For example, the request that: -

The impact methodology [should] concentrate on addressing key issues. This methodology to be employed in the report thus results in a circular route, which allows for the evaluation of the efficiency of the process itself. The assessment of actions in each phase [that should] be conducted in the following order:

- Assessment of key issues;
- Analysis of the activities relating to the proposed Braamfontein PRASA depot upgrade and maintenance project area;
- Assessment of the potential impacts arising from the activities, without mitigation, and
- Investigation of the relevant mitigation measures for both the construction and operational phases.

The following Assessment Criteria is Used for Impact Assessment

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities related to alternatives under study for meeting a project need. The significance of the aspects/impacts of the process will be rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The significance of the impacts will be determined through a synthesis of the criteria below:

Probability: describes the likelihood of the impact actually occurring

- Improbable: the possibility of the impact occurring is very low, due to the circumstances, design or experience.
- Probable: there is a probability that the impact will occur to the extent that provision must be made therefore.
- Highly Probable: it is most likely that the impact will occur at some stage of the development.
- Definite: the impact will take place regardless of any prevention plans and there can only be relied on mitigatory measures or contingency plans to contain the effect.

Duration: the lifetime of the impact

- Short Term: the impact will either disappear with mitigation or will be mitigated through

natural processes in a time span shorter than any of the phases.

- Medium Term: the impact will last up to the end of the phases, where after it will be negated.
- Long Term: the impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.
- Permanent: the impact is non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the impact can be considered transient.

Scale: the physical and spatial size of the impact

- Local: the impacted area extends only as far as the activity, e.g. footprint
- Site: the impact could affect the whole, or measurable portion of the above mentioned properties.
- Regional: the impact could affect the area including the neighbouring residential areas.

Magnitude/Severity: Does the impact destroy the environment, or alter its function

- Low: the impact alters the affected environment in such a way that natural processes are not affected.

Medium: the affected environment is altered, but functions and processes continue in a modified way.

High: function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.

Significance:

This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.

- Negligible: the impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.
- Low: the impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
- Moderate: the impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
- High: The impact could render development options controversial or the project

unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

The significance is calculated by combining the criteria in the following formula:

Sum (Duration, Scale, Magnitude) x Probability (Table -2)

S = Significance weighting; Sc = Scale; D = Duration; M = Magnitude; P = Probability

Table 5 -The significance weightings for each potential impact are as follows:

Aspec	Description	Weight
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Scale	Local	1
	Site	2
	Regional	3
Magnitude/Severit	Low	2
	Medium	6
	High	8
Significance	Sum (Duration, Scale, Magnitude) x Probability	
	Negligible	20
	Low	>20 40
	Moderate	>40 60
	High	>60

The significance of each activity was rated without mitigation measures (WOM) and with mitigation (WM) measures for both construction, operational and closure phases of the proposed development. To address the question of Heritage Management Plan the following table is used for Measures to be included in the EMP. This table is relevant in that it addresses key issues at the various stages of the project by also addresses how some of the key concerns that develop from a heritage point of view can be mitigated.

Table 6 - Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the environmental impact assessment specialist studies		
Project component/s	List of project components affecting the objective	
Potential Impact	Brief description of potential environmental impact if objective is not met	
Activity/risk source	Description of activities which could impact on achieving objective	
Mitigation: Target/Objective	Description of the target; include quantitative measures and/or dates of completion	
Mitigation: Action/control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above	Who is responsible for the measures	Time periods for implementation of measures
Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.	
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting	

4. ASSUMPTIONS, EXCLUSIONS AND UNCERTAINTIES

The assumptions, exclusions and uncertainties that exist in terms of the present study are discussed the following sub-sections.

4.1. Assumptions

The current study is Phase 1 HIA. As such, a historical and archival desktop study as well as a field survey were undertaken to identify tangible heritage resources located in and around the proposed development area footprint. The assumption is that a heritage social consultative process would have taken place with some of the Interested and Affected Parties (I&AP) to uncertain presence or known archaeological or heritage sites or existence of graves and cemeteries etc within Braamfontein PRASA depot, the City of Johannesburg Municipality Directorate Heritage (Immovable Heritage), various stakeholders in Newtown Cultural Precinct management team, the PHRAG (built environment & landscape as well as historic insight). However, there was no formal heritage social consultation that took place as part of the study - this is due to the nature of the current study- BA not a full EIA process. The study assumes that the amount of resources located within the current development footprint of Braamfontein Depot represent total amount of physical within the development footprint itself. However, there are a lot of historical resources around the site some of which form part of the Braamfontein which were excluded because they are not within the footprint. To identify and map them would require a separate study in a form of a Heritage Audit.

4.2. Exclusions

The following exclusions or limitations have direct consequence to the study and its results:

- There was no deeds search for the proposed Braamfontein PRASA depot upgrade and maintenance project area - the study area is owned by the developer, SARCC (Ltd)/PRASA and Transnet. PRASA is in the case the developer. There was therefore no need to conduct a deeds search for the property.

4.3. Uncertainties

Heritage studies like most other specialist studies often experience many challenges during and after the physical survey of the proposed development area. From an archaeological and general heritage perspective, the assumption is often made that, the amount of identified

archaeological and heritage resources during physical survey of the proposed development area represent some of the total amount of resources that exist in and around or along the development area. This is not often true because the nature of some the archaeological and heritage resources are subterranean in nature and as such, one cannot totally rule out their presence or existence within the proposed development area even though they are not recorded and map as part of the current study. These resources may be exposed or brought to the surface of the earth during the construction phase of the project which will involve excavation for infrastructure development and clearing of top soil in some instances. This presents one of the major uncertainties regarding the 'holistic' management of archaeological and heritage resources within and around the proposed development area. But, i doubt there will be any such resources with Braamfontein development footprint.

Archaeologist and heritage specialist alike refer to discovery of such resources as chance finds and to mitigate such uncertainty, it is advisable that should such chance finds be made of archaeological and heritage resources on site, the Environmental Control Officer (ECO) responsible for the site should report them to the nearest SAHRA or Amafa office or the nearest museum or call an archaeologist and heritage specialist to investigate the finds make necessary recommendations.

5. FINDINGS

5.1. Cadastral Search

The following maps of the Braamfontein development footprint were studied to assess the evolutions of the landscape in and around the Braamfontein Depot proposed for upgrade and maintenance project area:

- o The 1894 Plan of Johannesburg show that the Braamfontein Depot was already existing (119 years today) (Figure 12).
- o The 1895 Donaldson & Hills Stand Mp of Johannesburg show small railway siding activities on site (in Ward 1) (Figure 13).
- o The 1935, 1:50.000 Map of Johannesburg show the Braamfontein as fully developed to its size. Also shown on the map are the Kazerne (yellow circle) associated with the NZASM (1903) (Figure 14)

The 3 maps show that the Braamfontein Depo is significantly old. But environment and landscape features associated with it are today over 60 years and are generally protected in terms of the NHRA, No.25 of 1999.



Figure 12- 1894 Plan of Johannesburg and Suburbs. Printed and Published by the Standard & Diggers News. C° L^{TA} January 1894.



Figure 13 - 1895 Donaldson & Hills Stand Mp of Johannesburg, Witwatersrand.



Figure 14 -1935, 1: 50.000 Map of Johannesburg. Department of Land. Surveyor General Office, Pretoria. Kazerne (yellow circle)

5.2.Deeds Search:



No deeds search was conducted as part of the study. The project area is known to be the property of SARCC (Ltd)/ PRASA and it involves upgrade and maintenance of existing infrastructure. No new land will be surveyed for the purposed upgrades and development in Braamfontein PRASA depot for the current proposed development - as such title deeds search was not deemed necessary. The deeds information provided in the Arcus GIBB (2012) report is deemed sufficient enough. Deeds search plays a pivotal role in cases where there multiple stakeholders with different interests in project area with issues such as land claims and/or presence of ancestral graves etc. In the case both PRASA and Transnet are government Parastatals.



5.3. Field Survey and Identified Archaeological/Heritage Resources: Industrial Archaeology, Historic Built Environment & Landscape Features

Below is the analysis of the total number of buildings and other built environment and landscape features identified within the proposed project footprint. Building and these other built environment features are group together in clusters for better quantification and analysis of impact significance. Please note that the number of the building that were found outside the current project footprint and which are not included in the Braamfontein Depot Spatial Development framework are left out.

Site	BRAAMFONTEIN SITE COMPLEX-1		
Type	Structures		
Density	Approximately 20 structures	High Density	
Location/Coordinates	26° 11' 55.95"	28° 01' 12.35"	
Approximate Age (More than 60 Or Less than 60 years old)	<ul style="list-style-type: none"> • Most of the structures are older than 60 years and are the earliest buildings on the site/depot • Some less than 60 years old 		
Applicable Section of the NHRA, No 25 of 1999:	Section 34		
<p>Description:</p> <p>The site complex consists of approximately 22 buildings of various sizes, design and ages. Approximately 95 of the site consist of historic building- building that are over 60 years. However, most of these buildings lack basic building maintenance such as door or window repairs and paint work. The sheds are proposed to be demolished and the training school to be restored.</p>			
Photo	Building Name /Use	1.Building condition: 2.Proposed Development:	Age over

			/less than 60 years
	<p>Future simulator building.</p>	<p>1. Condition: The building is in a good state -recently refurbished. New paint on the walls and on corrugated iron roof.</p> <p>2. Proposed Development: The building will remain unchanged</p>	>60
	<p>Coach Cleaners Mess and Supervisors Office (with four outbuildings at the back).</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> • The external fabric of the building in both back and front facades (and sides) are in the original state structurally • Some windows are broken • The roof in state of neglect -require pain work • Doors in some of the outbuildings missing and windows broken 	>60



2. Proposed Development:

- The building will remain unchanged



Train operations

1. Condition:





- The external fabric of the building in both back and front facades (and sides) are in the original state
- Some windows are broken

2. Proposed Development:

- The building will remain unchanged



Train operations	<p>1. Condition:</p> <ul style="list-style-type: none">• The external fabric of the building in both back and front facades (and sides) are in the original state structurally.• They were dressed in paint at some point and it is now peeling• Windows are broken• Doors need repairs <p>2. Proposed Development:</p> <p>The building will remain unchanged</p>	>60
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		<p>Redundant Intensive Cleaning shed (2 sheds running parallel to each other</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> • The external fabric of the shed is weathered • They were dressed in paint at some point and it is now peeling • The roof tracilling is starting to rust. • The roof pane for light (sunlight) are weathered • Windows are broken <p>2.Proposed Development: demolished</p>	<p>>60</p>
				
		<p>Apprentice training school buildings</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> • The external fabric of the building in both back and front facades (and sides) are in the original state in terms of the structure. • They are, however, dressed in paint which covers the original brick • the building structure is 	<p>>60</p>



still in its original state except for the paint (all the decor still there)

- Air conditioners are installed throughout the building
- The roof is starting to weather
- Small corrugated sheds are attached to this building and are significantly old.

2. Proposed Development:

Proposed to be restored

				
		<p>Train operations</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> • New structure -generally good <p>2. Proposed Development: Remain train operations</p>	<p><60</p>

		<p>Redundant Intensive Cleaning shed (2 sheds running parallel to each other</p>	<p>1. Condition: • State of disrepair or neglect 2. Proposed Development: demolished</p>	<p><60</p>
				

-
- Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	3B	Localised	High	Low	Low significance	Probable	Construction & Operational phase	Mapping of the site and controlled sampling before destruction and restorations

Nature of Activities:

1. Construction Phase: construction, demolition and restoration of buildings in Braamfontein PRASA depot.

Operation Phase: maintenance of depot

	WOM	WM
Probability	Definite (5)	Definite (5)
Duration	Permanent (5)	Short term (1)
Scale	Site (2)	Local (1)
Magnitude/Severity	Medium (6)	Low (2)
Significance	(65)High	(8)Low
Status (positive or negative)	Negative	Positive

Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
<p>Mitigation:</p> <ul style="list-style-type: none"> • Mapping of the site and controlled sampling of the historic buildings within the whole site complex by a conservationist architect before destruction and restorations. • Destruction permits to be applied for with PHRAG since the proposed structure to be restored and demolished are older than 60years 		
<p>Cumulative impacts: Such impacts are expected with construction phases of the project when structures not initially earmarked for renovations and refurbishment are suddenly included in as part of renovations or refurbishments resulting to historic fabric and integrity of the site being compromised</p>		
<p>Residual Impacts:</p> <p>Positive: The project will positively enhance the aesthetic appeal of the depot, its usability and effective functioning of the train system in Johannesburg.</p> <p>Negative: With the destruction of some of the historic buildings, regardless of proposed mitigations, there is still a sense of loss of industrial heritage of Johannesburg</p>		


Measures for inclusion in the draft Environmental Management Plan:





OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development footprint i.e. the Braamfontein Depot.

Project component/s	Construction phase of the project	
Potential Impact	Destruction of buildings/structures which were not initially include in the list of buildings/structure proposed to be restored or demolished	
Project component/s	Operational phase of the project	
Potential Impact	During future maintenance programmes in the depot	
Activity/risk source	Not keeping to the objective of the current proposed Spatial Development Framework (SPF attached below)	
Mitigation: Target/Objective	A phase 2 study of this site complex is proposed based on the types of buildings contained within this site complex and the age of the buildings to be demolished, renovated and refurbished. This should be done prior to project construction phase. And as soon as possible to allow enough time for permission processes with PHRAG.	
Mitigation: Action/control	Responsibility	Timeframe
<ul style="list-style-type: none"> PRASA should commission a Phase 2 HIA to sample and document structures that will be destructed or restore. As well as other historic buildings within this site complex. This should be done by a qualified conservationist architect (Not an 	PRASA	Before the construction and operational phase of the project

<p>architectural historian).</p> <ul style="list-style-type: none"> An ICMP should be developed to manage other historical buildings within the site complex prior, during construction and after the construction phase. A process that should form part of the Phase 2 study. 		
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.	
Monitoring	<ul style="list-style-type: none"> ECO tasked with the Environmental Management of the site. PHRAG should also do site visits during the project construction phase to monitor if heritage management objective as recommended in the current and future documents are met. 	



Site	BRAAMFONTEIN SITE COMPLEX-2	
Type	Structures	
Density	Approximately 20 structures	High Density
Location/Coordinates	26° 12' 01.09"	28° 01' 12.82"
Approximate Age (More than 60 Or Less than 60 years old)	<ul style="list-style-type: none"> Most of the structures are older than 60 years Some less than 60 years old 	

Applicable Section of the NHRA, No 25 of 1999:	Section 34		
<p>Description:</p> <p>The site complex consists of approximately 27 buildings and structures (e.g. 12 x parking) of various sizes, design and ages. Approximately 99% of the buildings/ structure are over 60 years. The parking are proposed to be renovated and/or refurbished and some to be demolished. The Adult training school is on its final stages of renovations. The store sheds made of corrugated iron sheet and wood with wooden sash windows is proposed to be demolished - it is weathered to a state of disrepair. Two other structures were observed during the survey but were thought to be outside the site boundaries because they were on the other side of the fence. The Accommodation building is particularly in a good state.</p>			
Photo	Building Name /Use	1. Building condition: 2. Proposed Development:	Age over /less than 60 years
	Parking	1. Condition: The parking are well preserved. With exception to paint of roof being weathered. 2. Proposed Development: All the parking (12 x parking) in the site complex will be renovated and/or refurbished Some of the covered parking	>60

			<p>to be demolished</p>	
 		<p>Quality Assurance & Commissioning Office (Old App School). (Behind it is the engineering building (with 2 floors)).</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> • The building is well preserved and structurally sound <p>2. Proposed Development:</p> <ul style="list-style-type: none"> • The building will remain unchanged • Engineering building will remain unchanged 	<p>>60</p>
				

	Stores shed	<p>1. Condition:</p> <ul style="list-style-type: none"> The structure is made of corrugated iron sheet and wood with wooden sash windows. Both wood and corrugated iron sheets are weathered <p>2. Proposed Development:</p> <ul style="list-style-type: none"> Structure proposed to be demolished. 	60
	Adult Training School	<p>1. Condition:</p> <ul style="list-style-type: none"> The building is currently undergoing renovation and is at its final stages of refurbishments <p>2. Proposed Development:</p> <p>Proposed to be renovated and/or refurbished</p>	60

	<p>Medical Surveillance Centre</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> The structure is well preserved and generally in good state. Roof paint is weathered <p>2. Proposed Development:</p> <ul style="list-style-type: none"> The building will remain unchanged 	<p>>60</p>
	<p>Ticking Office (Vacant)</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> The structure is recent built and is sound. <p>2. Proposed Development:</p> <p>No proposals are made regarding it</p>	<p><60</p>

				
		<p>Left - female showers Right - Male showers</p>	<p>1. Condition: <ul style="list-style-type: none"> Recent structure -generally good 2. Proposed Development: Proposed to be renovated and/or refurbished</p>	<p>60</p>



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- Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPA	3D	Localised	Low	Low	Low significance	Probable	Construction & Operational phase	The corrugated iron and wood shed should be recorded before destruction and restorations need to be spelt out clearly for other buildings

Nature of Activities:		
1. Construction Phase: construction, demolition and restoration of buildings in Braamfontein PRASA depot.		
Operation Phase: maintenance of depot		
	WOM	WM
Probability	Definite (5)	Definite (5)
Duration	Medium term(3)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(30)Low	(20) Low
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: Recording of the store shed before destruction. Permits to be applied for with PHRA-G since the proposed structure to be restored and demolished are older than 60years		
Cumulative impacts: Such impacts are expected with construction phases of the project when structures not initially earmarked for restorations are suddenly in the renovations/refurbishments resulting to historic fabric and integrity of the site being compromised		

Residual Impacts:

Positive:

The project will positively enhance the aesthetic appeal of the depot, its usability and effective functioning of the train system in Johannesburg.

Negative:

With the destruction of some of the historic buildings, regardless of proposed mitigations, there is still a sense of loss of industrial heritage of Johannesburg

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within the proposed development footprint i.e. the Braamfontein Depot.

Project component/s	Construction phase of the project
Potential Impact	Destruction of buildings/structures which were not initially include in the list of buildings/structure proposed to be renovated/refurbished or demolished
Project component/s	Operational phase of the project
Potential Impact	During future maintenance programmes in the depot
Activity/risk source	Not keeping to the objectives of the current proposed Spatial Development Framework (SPF attached below)
Mitigation: Target/Objective	Recording and documentation of the stores shed prior to destruction and prior to project construction phase. And as soon as possible to allow enough time for permission process with PHRAG.

Mitigation: Action/control	Responsibility	Timeframe
PHRAG for the destruction of the store shed.	PRASA	Before the construction and operational phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.	
Monitoring	<ul style="list-style-type: none"> ECO tasked with the Environmental Management of the site/depot. 	

Site	BRAAMFONTEIN SITE COMPLEX-3	
Type	Structures	
Density	Approximately 8 structures	Low Density
Location/Coordinates	26° 12' 01.70"S	28° 01' 23.62"E
Approximate Age (More than 60 Or Less than 60 years old)	<ul style="list-style-type: none"> All the identified structures/buildings are older than 60 years 	
Applicable Section of the NHRA, No 25 of 1999:	Section 34	
Description:	<p>The site complex consists of approximately 5 built environment and landscape features: 1 building, a diesel depot office and 3 associated structure, a diesel tank and substation, and a redundant lifting shop. 100% of the buildings/ structure are over 60 years.</p>	

The parking are proposed to be renovated and/or refurbished. The Adult training school is on its final stages of renovations. The store sheds made of corrugated iron sheet and wood with wooden sash window is proposed to be demolished - it is weathered to a state of disrepair. Two other structures were observed during the survey but were thought to be outside the site boundaries because they were on the other side of the fence. The Accommodation building is particular is in good state.

Photo	Building Name /Use	1. Building condition: 2. Proposed Development:	Age over /less than 60 years
	Staff Pub	1. Condition: <ul style="list-style-type: none"> The structure is well preserved and generally in good state. Roof paint is weathered 2. Proposed Development: <ul style="list-style-type: none"> The building will remain unchanged 	>60



Substation



1. Condition:



- The building is well preserved and structurally sound

2. Proposed Development:

- No recommendation are made about this structure on the SDF (SDF below)

>60

				
		<p>Diesel Depot Offices</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> The 3 structures forming diesel depot offices are well preserved and sound <p>2. Proposed Development:</p> <ul style="list-style-type: none"> Offices to be demolished 	<p>60</p>

	<p>Diesel Depot Tank</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> The tank looks to be sound <p>2. Proposed Development:</p> <ul style="list-style-type: none"> No recommendation are made about this structure/feature on the SDF (SDF below) 	<p>60</p>	
		<p>Old Diesel Train Running Shed</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> The structure is made of corrugated iron sheet and the skeletal in steel tracilling. It is in fair state <p>2. Proposed Development:</p> <p>Structure proposed to be demolished.</p>	<p>60</p>

- Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPC	3E	Localised	Negligible	Negligible	Low significance	Probable	Construction & Operational phase	No further action required for site that requires destruction

Nature of Activities:		
1. Construction Phase: construction, demolition and restoration of buildings in Braamfontein PRASA depot.		
Operation Phase: maintenance of depot		
	WOM	WM
Probability	Improbable (1)	Improbable (1)
Duration	Short term(1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(4)Negligible	(4)Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: No further action necessary - the buildings/structures proposed to be destructed are simple offices with no potential to answer or contribute to any research question, architectural vernacular or aesthetics about the industrial heritage of the depot or Johannesburg. Nor to materials used in their construction. PHRAG should there exempt PRASA for permissions for these structures		
Cumulative impacts: Such impacts are expected with construction phases of the project when structures not initially earmarked for		

restoration are suddenly restored or added on resulting to historic fabric and integrity of the sight be compromised

Residual Impacts:

Positive:

The project will positively enhance the aesthetic appeal of the depot, its usability and effective functioning of the train system in Johannesburg.

Negative:

With the destruction of some of the historic buildings, regardless of proposed mitigations, there is still a sense of loss of industrial heritage of Johannesburg


Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within the proposed development footprint i.e. the Braamfontein Depot.

Project component/s	Construction phase of the project
Potential Impact	Destruction of buildings/structures which were not initially include in the list of buildings/structure proposed to be renovated/refurbished or demolished
Project component/s	Operational phase of the project
Potential Impact	During future maintenance programmes in the depot
Activity/risk source	Not keeping to the objectives of the current proposed Spatial Development Framework (SDF attached below)
Mitigation:	No further action necessary - the affected buildings are simple offices with no potential to answer or

Target/Objective	contribute to any research question, architectural vernacular or aesthetics about the industrial heritage of the depot or Johannesburg. PHRAG should exempt PRASA for permission these structures	
Mitigation: Action/control	Responsibility	Timeframe
No further action required. PHRAG should exempt PRASA on the permissions	PRASA	Before the construction and operational phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.	
Monitoring	<ul style="list-style-type: none"> ECO tasked with the Environmental Management of the site/depot. 	

Site	BRAAMFONTEIN SITE COMPLEX-4	
Type	Structures	
Density	Approximately 4 structures	Low Density (concentration)
Location/Coordinates	26° 11' 56.62"S	28° 01' 18.96"E
Approximate Age (More than 60 Or Less than 60 years old)	<ul style="list-style-type: none"> Most of the structures are older than 60 years One less than 60 years old 	

Applicable Section of the NHRA, No 25 of 1999:	Section 34		
<p>Description:</p> <p>The site complex consists of approximately 4 built environment and landscape structure/buildings: male shower building, shunters offices, contractors offices and the old fitting shed. The contractors offices are proposed for destruction/demolish, the male showers for renovations and there is nothing proposed for the other two structures. store sheds made of corrugated iron sheet and wood with wooden sash window is proposed to be demolished - it is weathered to a state of disrepair. All the structures on site are relatively in good state with minor defects.</p>			
Photo	Building Name /Use	1. Building condition: 2. Proposed Development:	Age over /less than 60 years
	Male showers	1. Condition: <ul style="list-style-type: none"> The structure generally in good condition with exception to the plumbing which is starting to cause leaching on the wall. 2. Proposed Development: <ul style="list-style-type: none"> The structure is proposed to be renovated and refurbished. 	>60




Shutters
Office

1. Condition:
- The building is well preserved and structurally sound
2. Proposed Development:
- No recommendation are made about this structure on the SDF (SDF below). An access point is to be created near it.

<60

	<p>Contactors Office</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> The structures with 2 offices in relatively in good state/condition. <p>2.Proposed Development:</p> <ul style="list-style-type: none"> Offices to be demolished 	<p>60</p>
	<p>Old lifting shed.</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> The shed is in a good state except that the painting is starting to weather which will influence the rusting/decay of the corrugated iron sheet <p>2.Proposed Development:</p> <ul style="list-style-type: none"> No recommendation are made about this 	<p>>60</p>

			structure/feature on the SDF (SDF below)	
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- Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	3D	Localised	Low	Negligible	Low significance	Probable	Construction & Operational phase	No further action required for site that requires destruction

Nature of Activities: 1. Construction Phase: construction, demolition and restoration of buildings in Braamfontein PRASA depot. Operation Phase: maintenance of depot		
	WOM	WM

Probability	Highly (4)	Probable (2)
Duration	Short term(1)	Short term (1)
Scale	Local (2)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(20)Low	(8)Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
<p>Mitigation: Impact significance of the site are low and do not necessitate further action. PHRAG should exempt PRASA for applying for permissions for this site. But, a qualified conservation architect should most probable be called to investigate for example how the male showers buildings it links or relate to other building of similar style, design and period within the site and make recommendations thereof.</p>		
<p>Cumulative impacts: Such impacts are expected with construction phases of the project when structures not initially earmarked for restoration are suddenly restored or added on resulting to historic fabric and integrity of the site being compromised</p>		
<p>Residual Impacts:</p> <p>Positive:</p> <p>The project will positively enhance the aesthetic appeal of the depot, its usability and effective functioning of the train system in Johannesburg.</p>		

Negative:

With the destruction of some of the historic buildings, regardless of proposed mitigations, there is still a sense of loss of industrial heritage of Johannesburg

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within the proposed development footprint i.e. the Braamfontein Depot.

Project component/s	Construction phase of the project	
Potential Impact	Destruction of buildings/structures which were not initially include in the list of buildings/structure proposed to be renovated/refurbished or demolished	
Project component/s	Operational phase of the project	
Potential Impact	During future maintenance programmes in the depot	
Activity/risk source	Not keeping to the objectives of the current proposed Spatial Development Framework (SPF attached below)	
Mitigation: Target/Objective	A phase 2 study of the sites proposed to be demolished or restored should be undertaken prior project construction phase. And as soon as possible to allow enough time for permission process with PHRAG.	
Mitigation: Action/control	Responsibility	Timeframe

Impact significance of the site are low and do not necessitate further action. PHRAG should exempt PRASA for applying for permissions for this site.	PRASA	Before the construction and operational phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.	
Monitoring	<ul style="list-style-type: none"> ECO tasked with the Environmental Management of the site/depot. 	

Site	BRAAMFONTEIN SITE COMPLEX-5	
Type	Structures	
Density	Approximately 19 structures	High Density (concentration)
Location/Coordinates	26° 11' 58.70"S	28° 01' 29.46"E
Approximate Age (More than 60 Or Less than 60 years old)	<ul style="list-style-type: none"> Most of the structures are older than 60 years Three are less than 60 years old 	
Applicable Section of the NHRA, No 25 of 1999:	Section 34	
Description:	The site complex consists of approximately 17 built environment and landscape structures/buildings which include among others:	

small repair component, main store, ablution facilities, lifting shop (with compressor room attached to it), filter cleaning building, substation, running shed and running shed accommodation, admin offices train operations and drivers rest. and two point can control at the back of the admin building. The filter cleaning, substation and compressor room are proposed for relocation. The ablution building and the shed are proposed for renovations and refurbishments. West of the sheds is parking which is proposed to be demolished. Also to be demolished is covered parking on the ramp. Behind the ramp are 3 redundant structures proposed to be demolished.

Photo

Building Name /Use

1. Building condition:
2. Proposed Development:

Age over /less than 60 years



Small repairs component

1. Condition:



- The structure generally in good condition with exception to roof painting which is weathered.






2. Proposed Development:



- The structure is proposed to be renovated and refurbished.



>60

	Main stores	<p>1. Condition:</p> <ul style="list-style-type: none"> The building has recently been refurbished - new brick on the industrial frame building skeleton <p>2. Proposed Development:</p> <ul style="list-style-type: none"> The structure is proposed to be renovated and refurbished 	60
	Ablution facilities	<p>1. Condition:</p> <ul style="list-style-type: none"> The ablution facilities look reasonable sound. <p>2. Proposed Development:</p> <ul style="list-style-type: none"> They are proposed to be renovated and refurbished. 	60
	Lifting shed.	<p>1. Condition:</p> <ul style="list-style-type: none"> The shed is in a good state. Like the main stores the structures has recently been refurbished - new bricks on the industrial steel frame building skeleton. <p>2. Proposed Development:</p>	60

			<ul style="list-style-type: none"> • The structure is proposed to be renovated and refurbished • The compressor house will be relocated. 	
		Filter cleaning	<p>1. Condition:</p> <ul style="list-style-type: none"> • The filter cleaning building is relatively new and in good shape <p>2. Proposed Development:</p> <p>The structure is proposed to be relocated.</p>	<60

		<p>Substation</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> The substation is old and the structure in good condition <p>2. Proposed Development: The structure is proposed to be relocated.</p>	<p>60</p>
		<p>Running shed and running shed accommodation (grey painted structure)</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> The shed is in a good state. <p>2. Proposed Development: The structure is proposed to be renovated and refurbished</p>	<p>60</p>
				

	Admin offices/train operations/train drivers resting	1. Condition: <ul style="list-style-type: none"> The admin office are in good state/condition 2. Proposed Development: <p>The structure is proposed to be renovated and refurbished</p>	60
	Point Cabin Control	1. Condition: <ul style="list-style-type: none"> The two buildings are new as compared to the rest of the structures on this site 2. Proposed Development: <ul style="list-style-type: none"> No recommendations or proposals made regarding them 	<60

	<p>Covered parking on the ramp</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> The car park is relatively new <p>2. Proposed Development:</p> <ul style="list-style-type: none"> The covered parking to be demolished 	<p><60</p>
	<p>3 x redundant structures</p>	<p>1. Condition:</p> <ul style="list-style-type: none"> The three redundant buildings are old but in bad state. <p>2. Proposed Development:</p> <ul style="list-style-type: none"> The structures are proposed to be demolished 	<p>60</p>

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- Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	3D	Localised	Low	Negligible	Low significance	Probable	Construction & Operational phase	Recording before destruction

Nature of Activities:

1. Construction Phase: construction, demolition and restoration of buildings in Braamfontein PRASA depot.

Operation Phase: maintenance of depot

	WOM	WM
Probability	Highly Probable (4)	Probable (2)
Duration	Long term (4)	Medium (1)
Scale	Local (2)	Local (1)




Magnitude/Severity	Low (2)	Low (2)
Significance	(32)Low	(8)Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: PHRAG should be notified since the proposed structures to be restored and demolished are older than 60years		
Cumulative impacts: Such impacts are expected with construction phases of the project when structures not initially earmarked for restoration are suddenly restored or added on resulting to historic fabric and integrity of the sight be compromised		
Residual Impacts: Positive: The project will positively enhance the aesthetic appeal of the depot, its usability and effective functioning of the train system in Johannesburg. Negative: With the destruction of some of the historic buildings, regardless of proposed mitigations, there is still a sense of loss of industrial heritage of Johannesburg		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within the proposed development footprint i.e. the Braamfontein Depot.

Project component/s	Construction phase of the project		
Potential Impact	Destruction of buildings/structures which were not initially include in the list of buildings/structure proposed to be renovated/refurbished or demolished		
Project component/s	Operational phase of the project		
Potential Impact	During future maintenance programmes in the depot		
Activity/risk source	Not keeping to the objectives of the current proposed Spatial Development Framework (SPF attached below)		
Mitigation: Target/Objective	A phase 2 study of the sites proposed to be demolished or restored should be undertaken prior project construction phase. And as soon as possible to allow enough time for permission process with PHRAG.		
Mitigation: Action/control	Responsibility	Timeframe	
PHRAG should be notified since the proposed structure to be restored and demolished are older than 60years	PRASA	Before the construction and operational phase of the project	
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	<ul style="list-style-type: none"> ECO tasked with the Environmental Management of the site/depot. 		

Site	BRAAMFONTEIN SITE COMPLEX-6		
Type	Structures		
Density	Approximately 2 structures	Low Density (concentration)	
Location/Coordinates	26° 11' 54.84"S	28° 01' 41.66"E	
Approximate Age (More than 60 Or Less than 60 years old)	<ul style="list-style-type: none"> • One structure is older than 60 years old -tower • The automated washer might just be less 		
Applicable Section of the NHRA, No 25 of 1999:	Section 34		
<p>Description:</p> <p>The site complex consists of approximately 2 structures. An automated washer and train (direction) viewing tower. The tower is still intact. The automated washer looks to be not functional at all - still intact though. These structures will be demolished. Regardless of its classic feel the tower also serves not objective on sites since there has been a shift in the industry to view on-coming trains in computers.</p>			
Photo	Building Name /Use	1. Building condition: 2. Proposed Development:	Age over /less than 60 year s
	Automated washer	1. Condition: <ul style="list-style-type: none"> • The automated washer looks to be disused . 	>60

			<p>2. Proposed Development:</p> <ul style="list-style-type: none"> The structures is proposed to be demolished. 	
		Tower	<p>1. Condition: The train (direction viewer) tower is still intact.</p> <p>2. Proposed Development: The structures is proposed to be demolished.</p>	

- Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPC	3E	Localised	Negligible	Negligible	Low significance	Probable	Construction & Operational phase	No further action required for site that requires destruction

Nature of Activities:		
1. Construction Phase: construction, demolition and restoration of buildings in Braamfontein PRASA depot.		
Operation Phase: maintenance of depot		
	WOM	WM
Probability	Highly Probable (4)	Probable (2)
Duration	Short term(1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(16) Negligible	(8) Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: No further action required for site that requires destruction		
Cumulative impacts: Such impacts are expected with construction phases of the project when structures not initially earmarked for restoration are suddenly restored or added on resulting to historic fabric and integrity of the site be compromised		

Residual Impacts:

Positive:

The project will positively enhance the aesthetic appeal of the depot, its usability and effective functioning of the train system in Johannesburg.

Negative:

With the destruction of some of the historic buildings, regardless of proposed mitigations, there is still a sense of loss of industrial heritage of Johannesburg

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within the proposed development footprint i.e. the Braamfontein Depot.

Project component/s	Construction phase of the project
Potential Impact	Destruction of buildings/structures which were not initially include in the list of buildings/structure proposed to be renovated/refurbished or demolished
Project component/s	Operational phase of the project
Potential Impact	During future maintenance programmes in the depot
Activity/risk source	Not keeping to the objectives of the current proposed Spatial Development Framework (SPF attached below)
Mitigation: Target/Objective	No further action required for site that requires destruction

Mitigation: Action/control	Responsibility	Timeframe
No further action required before destruction	PRASA	N/A
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.	
Monitoring	<ul style="list-style-type: none"> ECO tasked with the Environmental Management of the site/depot. 	

Site	BRAAMFONTEIN SITE COMPLEX-7	
Type	Structures	
Density	Approximately 1 structures	Low Density (concentration)
Location/Coordinates	26° 11' 54.84"S	28° 01' 41.66"E
Approximate Age (More than 60 Or Less than 60 years old)	<ul style="list-style-type: none"> One structure older than 60 years old 	
Applicable Section of the NHRA, No 25 of 1999:	Section 34	
Description:	The site complex consists of 1 built environment and landscape structure/building: the pump house. A shed has been attached to it.	

Photo	Building Name /Use	1. Building condition: 2. Proposed Development:	Age over /less than 60 years
	Automated washer	1. Condition: <ul style="list-style-type: none"> The structure generally in good condition all-round. 2. Proposed Development: <ul style="list-style-type: none"> The structure is proposed to be demolished 	>60

- Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	3D	Localised	Low	Negligible	Low significance	Probable	Construction & Operational	Recording before destruction

							phase	
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Nature of Activities:

1. Construction Phase: construction, demolition and restoration of buildings in Braamfontein PRASA depot.

Operation Phase: maintenance of depot

	WOM	WM
Probability	Highly (4)	Probable (2)
Duration	Medium (3)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)
Significance	(24)Low	(8)Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	

Mitigation: Recording before destruction

Cumulative impacts: Such impacts are expected with construction phases of the project when structures not initially earmarked for restoration are suddenly restored or added on resulting to historic fabric and integrity of the sight be compromised

Residual Impacts:

Positive:

The project will positively enhance the aesthetic appeal of the depot, its usability and effective functioning of the train system in Johannesburg.

Negative:

With the destruction of some of the historic buildings, regardless of proposed mitigations, there is still a sense of loss of industrial heritage of Johannesburg

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within the proposed development footprint i.e. the Braamfontein Depot.

Project component/s	Construction phase of the project
Potential Impact	Destruction of buildings/structures which were not initially include in the list of buildings/structure proposed to be renovated/refurbished or demolished
Project component/s	Operational phase of the project
Potential Impact	During future maintenance programmes in the depot
Activity/risk source	Not keeping to the objectives of the current proposed Spatial Development Framework (SPF attached below)
Mitigation: Target/Objective	A phase 2 study of the sites proposed to be demolished or restored should be undertaken prior project construction phase. And as soon as possible to allow enough time for permission process with PHRAG.

Mitigation: Action/control	Responsibility	Timeframe
Recording before destruction	PRASA	Before the construction and operational phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.	
Monitoring	<ul style="list-style-type: none"> • ECO tasked with the Environmental Management of the site/depot. 	

6. FIELD SURVEY RESULTS AND PROPOSED INFRASTRUCTURE

The physical survey of the project area took place between the 21 and 23 May 2013. The survey did not yield any traditional archaeological (from Stone Age to historical archaeology), burial grounds and graves, and other cultural features such as places or spaces of prayer. It only yielded over 100 built environment and landscape features in form of buildings and industry related technological features. Because of the challenges that came with the quantification of the total number of buildings identified it was decided to bulk some of the total number of the identified buildings in clusters called site complexes. For example, Braamfontein Site Complex 1, 2, 3, 4, 5, 6, and Braamfontein site complex 7 (Figure 15). The identified built environment and landscape features that were graded in terms of their significance and the impact significance of the proposed development on these resources took place for each of the 7 developed Braamfontein Site Complexes (i.e. Braamfontein Site Complex-1 to Braamfontein Site Complex-7). Through the system of impact significance analysis only one site complex (i.e. Braamfontein Site Complex-1) yielded buildings and structures that when assessed against the proposed development and resulted to High to Low impact significance of the project. High impacts will result if the proposed site mitigation measures are not implemented and low if the proposed impact mitigation measures are followed. The rest of the site complexes yield Low to Negligible impact significances i.e. Braamfontein Site Complex-2 to Braamfontein Site Complex-7. Out of the seven Braamfontein Site Complexes, 4 site complexes will require mitigation measures and they include:

- Braamfontein Site Complex-1; Braamfontein Site Complex-2; Braamfontein Site Complex-5; and Braamfontein Site Complex-7

The rest of the site complexes will not require to be mitigated and they include:

- Braamfontein Site Complex-3; Braamfontein Site Complex-4; and Braamfontein Site Complex-6

Below is the summary of the result yielded by the impact significance analysis:

1. Braamfontein Site Complex-1

Field	Grade	Impact	Impact	Impact	Heritage	Certainty	Duration	Mitigation
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Rating			Significance (without Mitigation)	Significance (with Mitigation)	Significance	of Impacts		
LS	3B	Localised	High	Low	Low significance	Probable	Construction & Operational phase	Mapping of the site and controlled sampling before destruction and restorations

2. Braamfontein Site Comple-2

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPA	3D	Localised	Low	Low	Low significance	Probable	Construction & Operational phase	The corrugated iron and wood shed should be recorded before destruction and restorations need to be spelt out clearly for other buildings

3. Braamfontein Site Comple-3

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPC	3E	Localised	Negligible	Negligible	Low significance	Probable	Construction & Operational phase	No further action required for site that requires destruction

4. Braamfontein Site Comple-4

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	3D	Localised	Low	Negligible	Low significance	Probable	Construction & Operational phase	No further action required for site that requires destruction

5. Braamfontein Site Comple-5

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPB	3D	Localised	Low	Negligible	Low significance	Probable	Construction & Operational phase	Recording before destruction

6 Braamfontein Site Comple-6

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
GPC	3E	Localised	Negligible	Negligible	Low significance	Probable	Construction & Operational phase	No further action required for site that requires destruction

7. Braamfontein Site Comple-7

Field Rating	Grade	Impact	Impact Significance (without Mitigation)	Impact Significance (with Mitigation)	Heritage Significance	Certainty of Impacts	Duration	Mitigation
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			Mitigation)	Mitigation)				
GPB	3D	Localised	Low	Negligible	Low significance	Probable	Construction & Operational phase	Recording before destruction

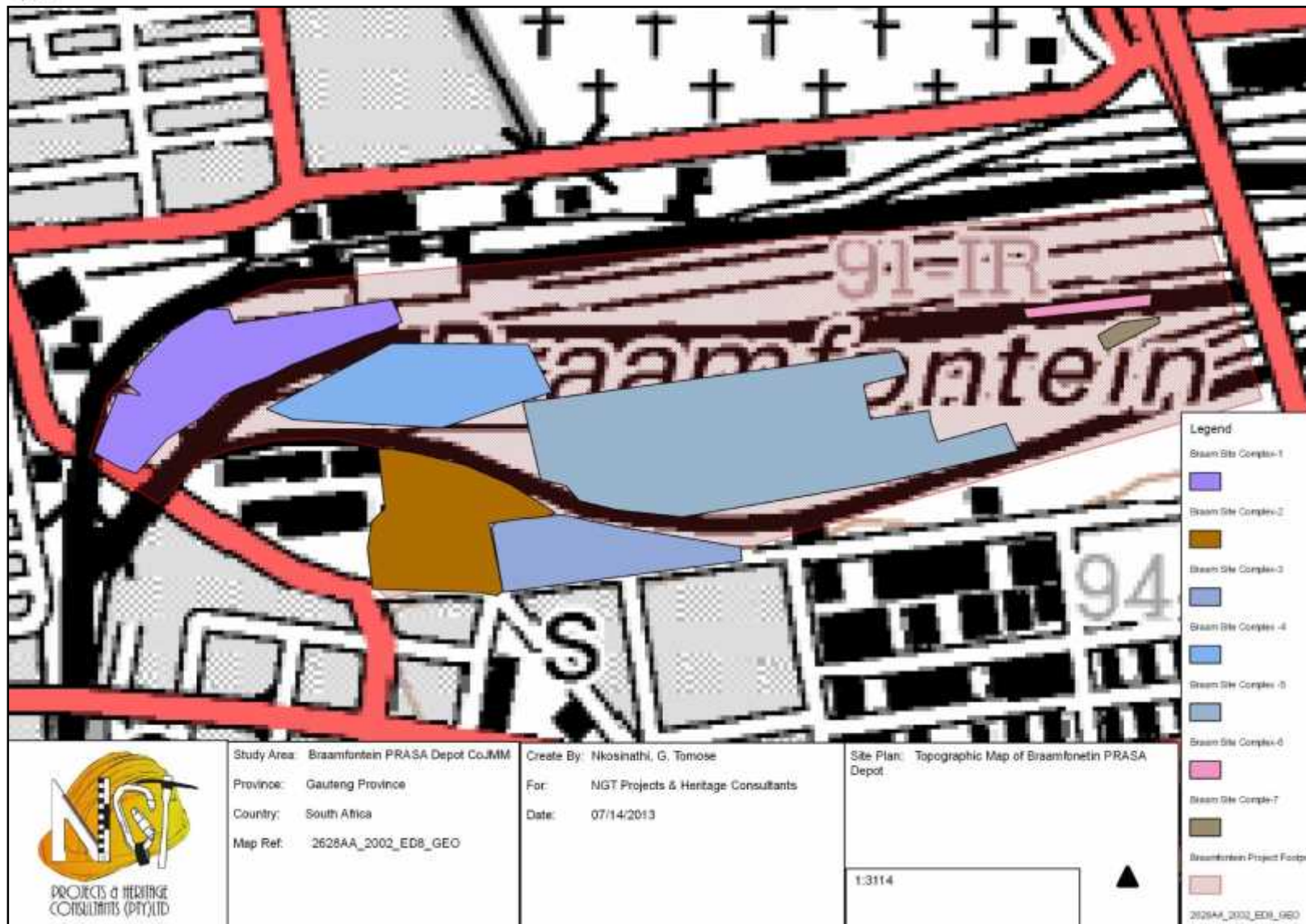


Figure 15- Distribution of sites identified by the current survey existing depot buildings, rail infrastructure (e.g. tracks etc), and overhead bridge.



7. CONCLUSIONS

The grading, assessment, evaluation of the identified sites (all industrial built environment and landscape features in form of buildings) within Braamfontein confirmed the held idea that Braamfontein Depot is one of historic important industrial sites with regards to the founding, development and expansion of the railway industry in South Africa. It is also concluded that number of structures identified within Braamfontein Depot proposed development footprint are historical sites, based on their age (over 60 years) and as a result they protected are protected in terms of the NHRA, No. 25 of 1999. Some of the buildings could be well over 120 years, based on the relative dates obtained about the depots existence through the use of archival maps as shown in Figures 12, 13 and 14. Structures and buildings that are over 60 years are protected in terms of Section 34 of the NHRA, No.25 of 1999. In provinces with existing Provincial Heritage Legislations such as KwaZulu-Natal the following sections would have been applicable and KZNHA, No.10 of 1997 (Section 26 (1)); and KZNHB, 2008 (Chapter 8 and section 29 (1). Based on the above discussion (Section 6 of this report) it is concluded that the following sites complexes should be mitigated before the commencement of the construction phase of the project:

- Braamfontein Site Complex-1; Braamfontein Site Complex-2; Braamfontein Site Complex-5; and Braamfontein Site Complex-7

The following site complexes do not require further action:

- Braamfontein Site Complex-3; Braamfontein Site Complex-4; and Braamfontein Site Complex-6

It is concluded that the current project upgrade/maintenance will have a minimal impact footprint on the identified resources provided they are mitigated as proposed in this HIA document. Therefore, in terms of heritage resources management there are no objections this project. The project can be given a positive review comment by PHRAG and ultimately a positive ROD provided that PRASA does agree to commit to addressing heritage concerns or mitigation measures proposed in this study.

8. RECOMMENDATIONS

- It is recommended that PHRAG approves the project in terms of cultural resources management since there are minimal negative impacts of the proposed project on the identified historical resources sites located within Braamfontein depot proposed development foot print.
- This should be with provision that PRASA agrees to addressing heritage concerns raised in this HIA document such as mitigating buildings in the following site complexes:
 - Braamfontein Site Complex-1; Braamfontein Site Complex-2; Braamfontein Site Complex-5; and Braamfontein Site Complex-7
- For the rest of the seven site complexes PRASA can be allowed to continue with proposed renovations and refurbishments as well as propose destruction in which case a trade-off needs to be made with PRASA addressing concerns raised about the following sites: Braamfontein Site Complex-1; Braamfontein Site Complex-2; Braamfontein Site Complex-5; and Braamfontein Site Complex-7. Then PRASA should be exempted by the authority to do permit applications for the following site complexes which also contain buildings and structures that are over 60 years old: Braamfontein Site Complex-3; Braamfontein Site Complex-4; and Braamfontein Site Complex-6.

Proposition to PRASA:

- A proposition is made to PRASA to consider developing a Full Heritage Audit of the total heritage resources found in and around its premises in Braamfontein Depot and Braamfontein Station to help contribute to the positive management of heritage resources in its property.
- This will be a based document for future development within Braamfontein Depot and Braamfontein Station.

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